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ENVIRONMENTAL ASSESSMENT OF THE PROPOSED JACK COUNTY POWER PLANT PROJECT JACK AND WISE COUNTIES, TEXAS BRAZOS ELECTRIC POWER COOPERATIVE, INC.

Prepared for:

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Acronyms and Abbreviations

%	percent
°F	degrees Fahrenheit
ac	acre(s)
ac-ft	acre feet
AOU	American Ornithologists' Union
BACT	Best Available Control Technology
BEG	U.S. Bureau of Economic Geology
BEPC	Brazos Electric Power Cooperative, Inc.
BMP	Best Management Practice
C&E	Construction and Engineering
CAAA	1990 Clean Air Act Amendments
CCN	Certificate of Convenience and Necessity
CFR	U.S. Code of Federal Regulations
CLF	civilian labor force
CO	carbon monoxide
CTG	Combustion Turbine Generator
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
ESA	Endangered Species Act
FAA	Federal Aviation Administration
Falcon	Falcon Gas Storage
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
ft	feet/foot
FWS	U.S. Fish and Wildlife Service
gpm	gallons per minute
GTG	gas turbine generator
HAP	hazardous air pollutants

HPA	high probability area
HRSG	Heat Recovery Steam Generator
HUD	U.S. Department of Housing and Urban Development
kV	kilovolt (1 kV = 1,000 volts)
L_{eq}	equivalent sound level
L_{dn}	day-night sound level
m	meter
MACT	Maximum Achievable Control Technology
MBTA	Migratory Bird Treaty Act
mg/l	milligrams per liter
MGD	million gallons per day
mph	miles per hour
msl	mean sea level
mVA	millivolt amps
MW	megawatts
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Pollutants
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NPV	net present value
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NWI	National Wetlands Inventory
NWS	National Weather Service
OTHM	Official Texas Historic Marker
Pb	lead
PEM	palustrine emergent marsh
$PM_{[n]}$	particulate matter with an aerodynamic diameter of *[n]*
PSD	Prevention of Significant Deterioration
PUCT	Public Utility Commission of Texas
RFP	Request for Proposal
ROW	right-of-way
RUS	Rural Utilities Service
SAL	State Archeological Landmark
SCS	Soil Conservation Service
SDHPT	State Department of Highways and Public Transportation
SIP	State Implementation Plan
SO_2	sulfur dioxide

SOC	Species of Concern
SPS	Special Protection System
STG	Steam Turbine Generator
TARL	Texas Archeological Research Laboratory
TCEQ	Texas Commission on Environmental Quality (formerly the TNRCC)
TCPA	Texas Comptroller of Public Accounts
TDA	Texas Department of Agriculture
TDWR	Texas Department of Water Resources
TESS	U.S. Fish and Wildlife Service's Threatened and Endangered Species System
THC	Texas Historical Commission
TNRCC	Texas Natural Resource Conservation Commission (now the TCEQ)
TOES	Texas Organization for Endangered Species
TORI	Texas Outdoor Recreation Inventory
TORP	Texas Outdoor Recreation Plan
TOS	Texas Ornithological Society
TPWD	Texas Parks and Wildlife Department
TSDC	Texas State Data Center
TSP	total suspended particulate
TWC	Texas Workforce Commission
TWDB	Texas Water Development Board
TXBCD	Texas Biological and Conservation Data System
TxDOT	Texas Department of Transportation
TXUFCO	TXU Fuel Company
$\mu g/m^3$	micrograms per cubic meter
US	United States
USACE	U.S. Army Corps of Engineers
USBOC	U.S. Bureau of the Census
USDA	U.S. Department of Agriculture

1.0 Introduction

1.0 INTRODUCTION

Brazos Electric Power Cooperative, Inc. (BEPC) is proposing to construct a 500-megawatt (MW) gas-fired, combined-cycle electric generation station near Joplin, Jack County, Texas. The project will consist of two combustion turbines and heat recovery steam generators, and one steam turbine with a water-cooled steam surface condenser.

The Rural Utilities Service (RUS) has determined that the proposed project warrants an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA). BEPC subsequently contracted PBS&J to prepare this EA. The RUS will use this EA to assist in deciding whether additional NEPA documentation may be required (e.g., Environmental Impact Statement (EIS)) or if the project may proceed following issuance of a Finding of No Significant Impact (FONSI).

2.0 Project Description

2.0 PROJECT DESCRIPTION

2.1 PURPOSE AND NEED

In anticipation of electric retail deregulation, BEPC entered into a 5-year (1999–2003 expiring 12/31/03), full requirements contract with Mirant Americas Energy Marketing, formerly Southern Company Energy Marketing. The purpose of this contract was partially to insulate BEPC from the cost uncertainty of retail deregulation. BEPC relies to a large degree on market purchases and extremes in market prices could prove to be detrimental. Several events, including the expiration of the Mirant contract, the continuation of record-breaking growth in demand, retail competition, and the decision of BEPC's members in regards to participation in customer choice prompted BEPC to begin studying power supply alternatives for the post-Mirant Period.

According to the 2001 Load Forecast, demand in the BEPC Integrated System will increase from 2,167 MW in 2003 to almost 4,504 MW in 2020. BEPC's need for additional capacity is forecast to increase from approximately 1,569 MW in 2006 to over 3,873 MW in 2020.

The 2002 Power Supply Study, including reports detailing Phases I, II, and III of the Study (as detailed in the following text), was submitted to the RUS on December 4, 2002. BEPC's Request for Proposals (RFP) was included as part of the Phase II Study report. The RFP was initially submitted to the RUS on November 21, 2001. The Phase II Power Supply Study report (Burns & McDonnell, 2002) was initially submitted to RUS on July 10, 2002. As of this writing, BEPC has not received notice of RUS approval of the study or the RFP.

In Phase I of the 2002 Power Supply Study, BEPC's consultant assessed the Electric Reliability Council of Texas (ERCOT) market for capacity and energy prices, and evaluated the impact of market prices on BEPC's cost under various scenarios. In addition to the base case, the study included scenarios for high, low, and mid-range fuel prices; low and boom/bust cycle cases for merchant plant development; low cost and high cost cases for emissions; weak and strong economy, and mild and severe weather cases for load growth; and south-north transmission limitations. The study concluded that owning combined cycle generation was beneficial, and recommended that BEPC evaluate building new generation capacity.

In Phase II, BEPC and its consultant evaluated the cost of various self-build generation alternatives; issued a Request for Proposals (RFP) for 1) a full-requirements contract; 2) ownership of new or existing generation; and 3) purchases of capacity and energy; and analyzed the proposals submitted. This phase of the study concluded that a combination of building 500 MW of combined cycle generation, and purchasing capacity and energy provides the lowest total revenue requirements.

In Phase III, BEPC continued analysis of the costs for various power supply alternatives. Annual revenue requirements and the net present value (NPV) of revenue requirements for combinations of building

500 MW of generation, and 3-year and 5-year capacity purchases were compared. Cases with combinations of the following alternatives consistently rank among the lowest NPV:

- Building 500 MW of combined cycle generation in 2005 or 2006
- Purchasing 500 MW of capacity and energy from C&E (Construction and Engineering) Bidder A
- Purchasing 250 MW of capacity and energy from C&E Bidder F.

Congestion costs have differing impacts on the capacity purchase alternatives. Cases with combinations of the same power supply alternatives continued to rank among the lowest NPVs, but combinations that included the C&E Bidder F alternative had slightly higher NPVs. The NPV from 6 to 7 of the cases varied by less than 1 percent (%), indicating the combinations produced almost identical results.

Based on these analyses, the BEPC Board of Directors approved negotiations with C&E Bidder A and Bidder F, and further study of building 500 MW of combined cycle generation.

2.2 DESCRIPTION OF POWER PLANT

The proposed facility addressed in this report will be a combined-cycle power plant producing a nominal 620 MW. The facility design is a two-on-one configuration (two combustion turbines and one steam turbine), single fuel (natural gas), duct-fired power plant with inlet air fogging. The steam turbine exhaust will be condensed in a water-cooled steam surface condenser, and a cooling tower will cool the hot circulating water. Specific equipment to be utilized consists of:

- Two F-Class advanced firing temperature Combustion Turbine Generators (CTGs)
- Two Heat Recovery Steam Generators (HRSGs), using duct-fired, three-pressure level, natural circulation design with steam reheat and superheater sections. Selective Catalytic Reduction (SCR) will be used for NO_x control. Space and support framing will be provided for future CO catalyst.
- One 300-MW (nominal) Steam Turbine Generator (STG): down exhaust, reheat, condensing type.

The proposed plant is to be operated as a Base Load plant, running an average of 8,500 hours per year (non-overhaul years) or 7,530 hours per year (major overhaul years). Plant annual startups will be less than 50. The main Power Island will be made up of the major power generation equipment and the associated auxiliary equipment. The Power Island consists of two CTGs; two triple-pressure-level, duct-fired, reheat HRSGs; one condensing, reheat, down exhaust STG, exhausting to a de-aerating steam surface condenser; boiler feedwater pumps; and condensate pumps. Figure 2-1 shows the proposed site arrangement and plant layout, while Figure 2-2 is an artist's rendering of the completed power plant facilities.

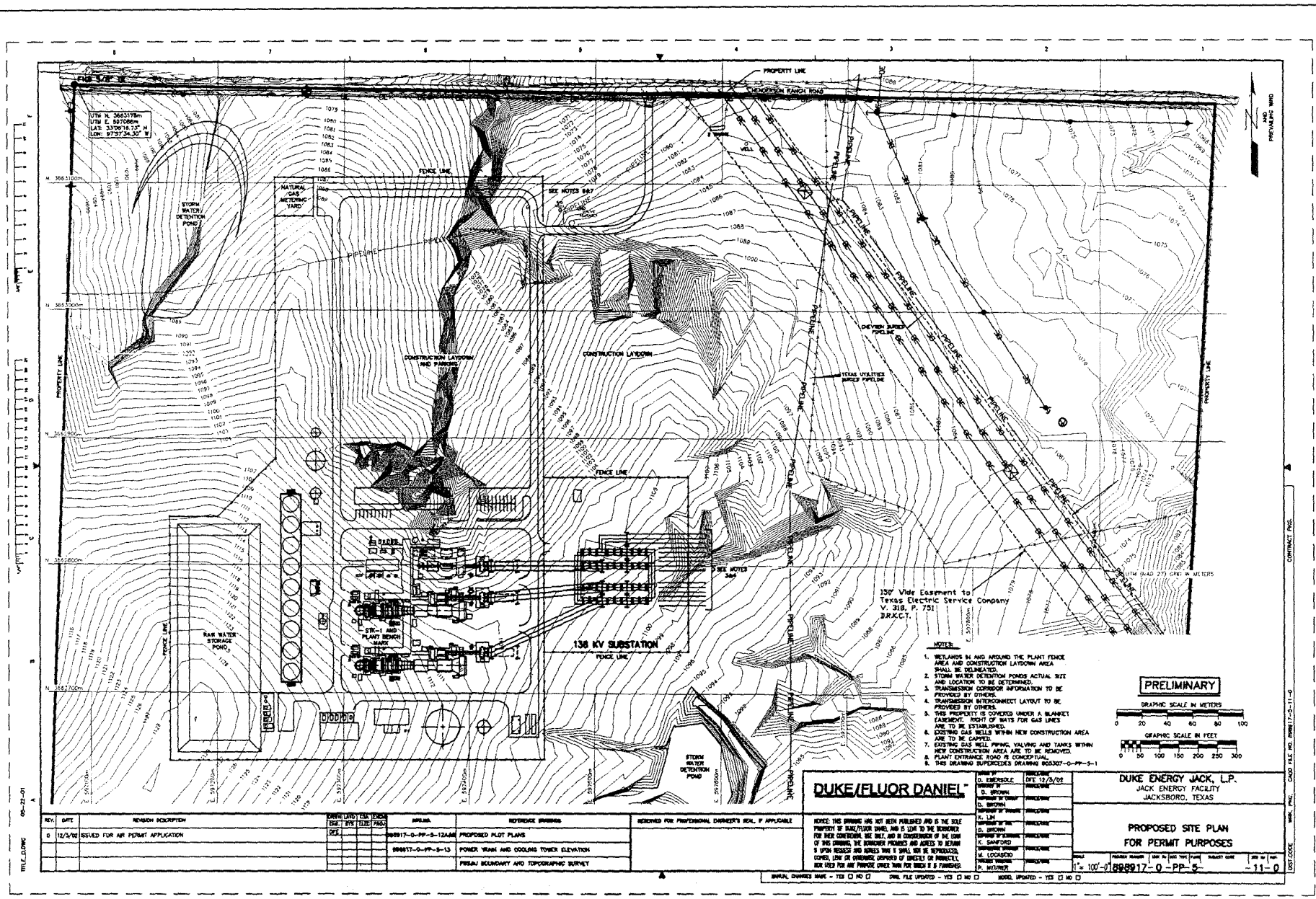
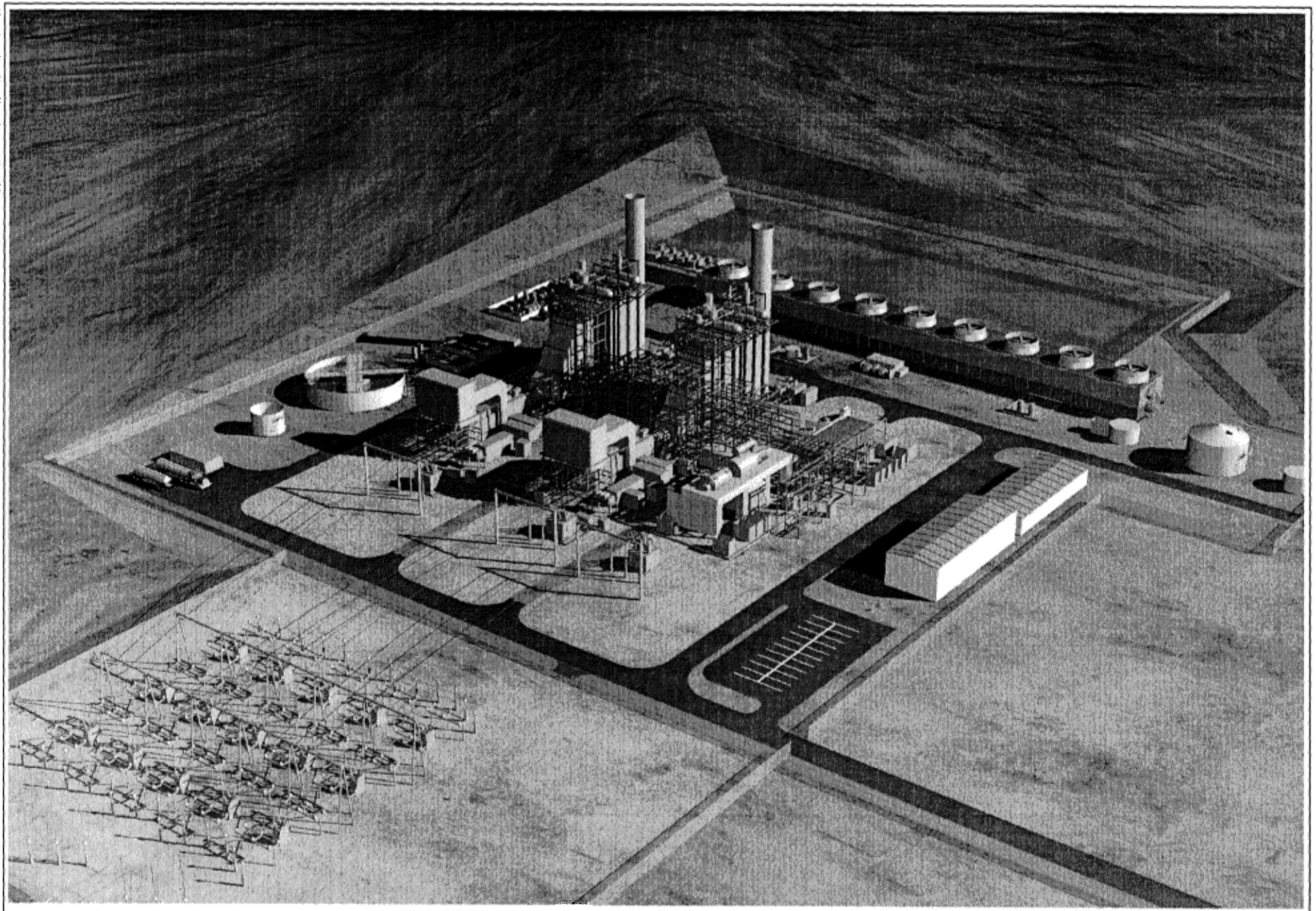


Figure 2-1. Proposed Site Plan, Jack County Power Plant

Source: BEPC, 2003



Source: BEPC, 2003

Figure 2-2. Artist's Rendering of Proposed Power Plant.

The following information on plant systems and facilities was obtained from Brazos Electric Cooperative-Jack Energy Facility; Exhibit D – Technical Scope of Work; Turnkey Engineering, Procurement and Construction; March 2003 (BEPC, 2003).

2.3 COOLING (CIRCULATING) WATER SYSTEM

A cooling water system shall provide a continuous supply of cooling water to the steam surface condenser and to the closed cooling heat exchangers. A "circulating" type of system, involving a cooling tower, shall be used. Main components of the cooling water system described in this section, are: circulating water pumps, circulating water piping, cooling tower with basin and pump pit, closed cooling heat exchanger, and auxiliary circulating water pumps.

Size and basic design parameters of the main components of the cooling water system shall meet the performance requirements established for the condenser and steam turbine at vendor guaranteed load conditions.

2.3.1 Circulating Water Pumps

- Three (3) 50% capacity circulating water pumps shall be provided and shall be designed for continuous service.
- The pumps shall be vertical (single stage, mixed flow) types.
- The pumps and all associated valves, lubrication equipment and accessories shall be located adjacent to the cooling tower. The pump pit shall be equipped with intake screens to protect the pumps from debris. The screen channel shall be oversized by at least ½" to prevent screen jamming in the channel during installation and removal due to organic or chemical growth. An overhead monorail and electric hoist shall be provided to facilitate screen removal. The screen shall have ½" maximum opening size and shall be stainless steel.
- The pump pit shall be equipped with a level transmitter to indicate water level.
- Design Conditions and Performance Requirements
  - The pump minimum submergence and NPSH available shall be sufficient to prevent cavitation under the Operating Conditions.
  - The structural integrity of pumps, drivers, and accessories shall not be impaired by flow reversal through non-operating pumps.
  - The pumps shall be suitable for outdoor locations.
  - The pumps shall be mounted in a pump structure (pit) that extends off the cooling tower basin.
  - The sources, descriptions, and chemical analysis of circulating water and water available for bearings, seals, and cooling shall be provided to the pump manufacturer.

- Each pump shall be directly connected to an electric motor driver. The electric motors shall be furnished with non-reverse ratchets.

- Pump performance curves shall include total developed head, brake horsepower, NPSHR, and efficiency plotted as functions of volumetric flow rate between shut-off and run-out.

- Torque-speed curves from zero to rated pump speed shall be provided. These shall include starting against a closed discharge valve.

- The system-operating mode shall be arranged to start each pump against a partially open discharge valve, which shall fully open automatically as the pump comes up to speed.

- Design and Construction Features
  - Each component, including the motor driver, shall be designed to resist all static and dynamic loads imposed on it during all modes of pump operation. The operating modes include normal operation in any parallel arrangement, start-up, and shutdown.

  - The pump and motor shall be designed for easy removal and replacement.

  - The impeller shall be dynamically balanced to ISO 1940.

  - Impeller diameter shall be such that at least a 5% head increase at rated flow can be obtained by installing a larger diameter impeller of the same pattern.

  - The net axial thrust shall be balanced. This thrust bearing shall be sized to balance the maximum axial thrust that may occur during any mode of pump operation from minimum flow to runout.

  - Open impeller with no wear rings shall be provided.

  - Shaft sections shall be machined over their full lengths. Replaceable sleeves with the proper surface characteristics of roughness and hardness shall be provided at the stuffing box.

  - All pump and shaft bearings shall be water lubricated. The source of lubricating water shall be fresh/clean water from another furnished pressurized system, or internally lubricated with cooling water, provided that the water quality is acceptable for this purpose as determined by the pump manufacturer. If the lubricating water requires filtration or other processing prior to use, then the Facility shall include the necessary equipment as part of the lubricating system.

  - The system controls, pump controls and piping shall be designed such that the cooling tower distribution headers are protected from both over-pressure and flow surge or water hammer damage.

- Auxiliary Circulating Water Pump
  - An auxiliary vertical circulating water pump shall provide auxiliary cooling water when the main circulating water pumps are not running.

2.3.2 Circulating Water Pipe

Circulating water piping from the circulating water pumps to the surface condenser, and from the surface condenser to the cooling tower area, shall be primarily via underground piping. Pipe shall be designed to withstand internal pressures, both operating and transient. Minimum design pressure shall be higher than the pressure corresponding to the shutoff head of the pump.

Maximum flow velocity shall not exceed 15 feet/sec.

High-Density Polyethylene (HDPE) material shall not be used for Circulating Water piping.

- The piping system shall be designed to withstand external loads; both with the pipe empty and in combination with internal pressure. Buried portions of pipe shall be capable of resisting internal pressure without backfill in place. Pipe installed under traffic areas shall be designed to withstand HS20-44 truck loading.
- Cathodic protection shall be provided for buried steel pipe.
- Design and Construction Features:
  - The stiffness of pipe and restrained joints and/or supports shall be utilized to counteract unbalanced forces imposed in the piping system.
  - Expansion joints shall be used at the inlet and outlet condenser waterbox connections for thermal expansion and fit. All joints shall be tied joints.
  - Butterfly valves used in the circ water piping shall not be used for throttling duty. They shall be open/close only.

2.3.3 Cooling Tower

The Facility shall include a cooling tower and accessories in accordance with Cooling Tower Institute Standards, as applicable. The cooling tower shall be designed to reject the heat energy returned from the steam surface condenser and auxiliary plant heat exchangers to atmosphere.

- Design Conditions and Performance Requirements
  - The cooling tower shall be designed to provide the cold water temperatures consistent with the plant design criteria.
  - The cooling tower design shall be of mechanical induced draft, multi-cell, counter flow type.

- Arrangement and orientation of the cooling tower shall take into account the prevailing wind direction.

- The cooling tower shall be designed to operate using treated raw water as described in Section 2.3.

- Maximum drift rate shall be designed to meet the PM10 requirement in the air permit.

- The tower (including fill and its support system) shall be designed to include necessary features to prevent damage from freezing during start-up and operation under any mode.

- A manual control bypass system shall be provided to bypass return water directly to the cooling tower basin under freezing conditions or during start-up.

- Materials for the tower and accessories shall be suitable for use with the cooling water quality. In general, materials shall be plastic (PVC) fill, PVC distribution piping, fiberglass fan blades and shrouds, epoxy coated steel fan support framing, treated Douglas Fir or fiberglass framing, and stainless steel hardware.

- Motors shall be TEFC, single speed, Class F insulation, with 1.15 service factor. Fan bhp at rated conditions shall not exceed motor nameplate rating under operating conditions.

- Gear Reducers shall be right-angle design per AGMA Standards with safety factor of 2.0 on nameplate HP and with direct coupled, shaft driven oil pumps, sealed B-10 rated bearings, and equipped with vibration switches.

• Design and Construction Features

  - Partition walls shall be provided for internal baffling, shall be designed for all combinations of fans in service, and shall provide an isolation due to shutdown of any single fan-cell for maintenance and inspection or fire control.

  - For wood towers, a stairway access/egress shall be provided at one end of the tower and a minimum of one ladder egress at the opposite end.

  - The distribution system shall be provided with sufficient valves to allow complete isolation of each cooling tower cell.

  - The cold water basin shall be sized to provide adequate volume for safe shutdown.

  - The cooling tower fans shall be furnished with single-speed motors and manual variable pitch fan blades.

  - High vibration sensing switches shall be provided for each fan. High vibration shall cause a DCS alarm and trip the fan.

- Fire Protection System: For a wood tower, a complete cooling tower fire protection system as defined in NFPA 214 shall be provided.
- Flow Model Testing: A flow model of the cooling tower pump pit shall be done during the execution of the project. Owner shall have rights to witness the test, and receive copy of the test report. Contractor shall incorporate recommendations from the test into the pit design, or provide to Owner technical justification for not doing so.

2.3.4 Closed Cooling Water System

A closed cooling water system shall be provided and designed to remove the thermal load from all auxiliary items requiring cooling water. The system shall be designed to use a water/glycol mixture.

- Closed Cooling Water Heat Exchangers
  - The system shall utilize three (3) 50% capacity heat exchangers for heat rejection.
  - The materials of construction shall be adequate for the water chemistry of the circulating water and closed cooling water mixture.
- Closed Cooling Water Pumps
  - Two (2) 100% capacity closed cooling water pumps shall be provided.
  - The pumps shall be centrifugal, horizontal-type driven by constant speed motors.
  - Each pump shall be complete with case, shaft, impeller, base plate, coupling, coupling guard, and driver.
- Auxiliary Cooling Water Heat Exchanger Pump

  An auxiliary cooling water pump shall be provided to supply auxiliary cooling water from the circulating water line to the closed cooling water heat exchangers, when the Circulating Water Pumps are not running.
- Other Requirements: All piping, valves, instrumentation and controls shall be designed and provided. Also, a water expansion tank shall be provided.

2.4 FUEL GAS SUPPLY SYSTEM AND DIESEL FUEL STORAGE & HANDLING SYSTEM

Natural gas shall be used as the only fuel for each combustion turbine, duct burner and auxiliary boiler.

The Owner shall provide natural gas service to the location coordinates and elevation specified by the Contractor, which shall be located adjacent to the fuel gas metering area and approximately ten feet (10') outside the metering area fence. The system shall include all piping and equipment from the natural gas interconnection flange near the Owner provided Fuel Gas Metering and Valve Skid to the combustion

turbines, duct burners, and auxiliary boiler. Fuel gas parameters from the Fuel Gas Metering and Valve Skid shall be monitored in the DCS via a fiber optic communication link.

2.4.1 Fuel System Design Criteria

- Fuel temperature and pressure must meet the CTG, HRSG and auxiliary boiler Original Equipment Manufacturer's (OEM's) specification.
- Fuel composition shall be per Attachment 12.0.
- Under no circumstances shall free moisture be allowed to enter the CTG combustion system (water or condensed hydrocarbons).

2.4.2 Natural Gas Odorizer

Natural gas supply shall not be piped to the Administration/Control building, Warehouse/Maintenance building or any Building/Enclosure, and shall not be odorized.

2.4.3 Diesel Fuel Storage and Handling

- Diesel fuel storage and handling facilities shall be limited to that required for the single diesel firewater pump driver and the back-up diesel generator.
- The diesel driver shall be furnished with a day storage tank on its base sufficient for 12 hours of run time. A containment curb to contain any spills from the fuel loading operation shall surround the diesel system.

2.5 RAW WATER STORAGE SYSTEM

The Raw Water Storage System shall serve as: (1) Firewater source; (2) Surge protection against extreme climate beyond the design conditions; (3) Supply, for limited duration, in case of water source disruption. Raw water storage shall be for both the Phase I plant and the future air-cooled Phase II plant.

Raw Water Pond:

- Pond shall have an operating capacity of 6,000,000 gallons.
- Pond shall be lined with a geomembrane per the requirements of Attachment 15.0. The liner shall be designed for exposure to raw water conditions of Attachment 10.0, and shall be designed for: minimum air temperature of –1°F; maximum air temperature of 113°F; pH range of 5 to 12; exposure to UV light; and exposure to trace concentrations of diesel fuel, fuel oil (#2), and lubricating oils and greases.
- Pond shall be designed such that full firewater capacity is below the raw water suction pipe and cannot be utilized through the raw water suction pumps.
- Depth of pond shall include 12 inches allowance below the lowest suction pipe in order to avoid the solids accumulation in the pond.

- Pond depth shall include sufficient freeboard to account for a single 25-year, 24-hour storm event plus maximum wave run-up, but not less than 24 inches.
- Sides of pond shall be sloped as required for ground and liner stability, but not greater than 3 horizontal to 1 vertical.

Pump bay at the storage pond shall include firewater pumps, firewater jockey pumps, and pumps for raw water supply to the Raw Water Treatment System.

2.6 RAW WATER TREATMENT SYSTEM

The design and installation of a Raw Water Treatment Facility shall be for the combined Phase I plant and the future air-cooled Phase II plant.

Lake Bridgeport and treated wastewater (gray water) are the sources for raw water, and analysis of each water source shall be the design basis of the Facility.

Raw water quantity requirements shall be based on 8 concentration cycles of cooling tower water to the condenser.

The raw water shall need to be cleaned/treated (clarified/filtered) to provide a source for:

- Cooling Tower Make-up Water (due to evaporation and drift losses as well as blowdown of the tower)
- Plant Service Water (to oil-water separator, utility stations, etc.)
- Demineralized Make-up Water

Raw Water Treatment System Description:

- Incoming raw water (from the Owner-supplied water pipeline to site) shall be chlorinated and stored in an open-air lined pond.
- A solids contact-type clarifier, using lime, polymer and coagulant aid to enhance precipitation and flocculation shall first treat raw water.
- The treated water (clarifier overflow) shall then be filtered through multimedia gravity filters (sand filters) and stored in a below ground clearwell (concrete sump).
- Filter backwash waste water and the clarifier sludge blowdown shall be collected in a sludge sump. To minimize wastewater, most of the water from the sludge sump shall be recycled through the clarifier.
- Excess sludge shall be processed through a sludge thickener and de-watering system. Decant water from the thickener and de-watering system shall be recycled via the sludge sump and clarifier.

- Sludge from the thickener shall be sent to a filter press (elevated in a metal enclosure/building) where water is removed and the remaining sludge cake is dropped into a truck for (Owner) hauling to a local landfill. The water is sent to the sludge sump.
- Treated water in the clearwell sump shall be pumped: (1) to the cooling tower basin for make-up water purposes; (2) for service water requirements such as utility stations, filter backwash requirements, etc.; (3) as feed to the Demineralization System for demineralized water production.

2.7 WASTEWATER TREATMENT SYSTEMS

The Facility shall include the collection of all process waste and sanitary waste streams within the site. The point of connection for the process waste off site discharge shall be defined by the Contractor, including location coordinates and elevation. The point of connection shall be located approximately 10' within the plant fenceline. Owner shall supply the piping system outside of plant fenceline.

All sanitary waste streams shall be combined before discharge to the septic system and leach field at the plant site.

Plant oily water drains shall gravity flow into an oily water sump, and shall be pumped through an oil-water separator. From the oil-water separator, the clear water shall gravity drain to the clear water sump and be recovered for cooling tower make-up. The oil from the separator shall drain into a separate sump that shall be capable of being drained by a truck with a vacuum pump. Oil contained in the water discharge shall be less than or equal to 15 ppm, or as required by the permit.

Oil containment curbing/basin shall be provided for each main transformer. A drain, using either pipe and a manual valve or a manually operated pump, shall be supplied to drain oil-free water from the containment. The containment shall be capable of being drained by a truck with a vacuum pump when oil is present. A local power outlet shall be installed for a portable submersible pump.

Water from the combustion turbines water wash operation shall drain into a containment sump. The sump shall be capable of being drained by a truck with a vacuum pump.

2.8 ASSOCIATED UTILITY INFRASTRUCTURE

BEPC is planning to locate or utilize gas pipelines, water and wastewater pipelines, and electric transmission lines within a single broad corridor. Figure 2-3 (map pocket) illustrates the location of these utility corridors for each of the primary power plant sites in the region.

2.8.1 Fuel Supply

Fuel for the proposed power plant will be natural gas, at a sufficient flow rate and pressure at the plant boundary such that no fuel gas compression or special treatment is required. One or more natural gas

pipelines and interconnection/metering facilities with one or more gas transportation entities would be required for the proposed project. One gas pipeline could be constructed in the same ROW as the water pipeline from Lake Bridgeport. Additional gas pipelines might also be routed along existing electric transmission line ROWS.

The proposed plant site is located in a natural gas producing region of North Texas. BEPC has determined that transportation services are available from at least three gas transportation entities, and fuel supplies and transportation are available from at least one gas gatherer/producer. These entities each have high-pressure gas pipeline facilities in the region.

The nominal 500 MW combined cycle plant, operated at a 100 percent daily capacity factor, requires approximately 84,000 MMBtu per day of natural gas. At an annual capacity factor of 90 percent, the plant fuel requirement would be 27.6 BCF or 27.6 million MMBtu per year.

With supplemental duct-firing, the plant capability could be increased to 620 MW. The maximum daily natural gas requirement for the 620 MW plant, assuming that the duct-fired capability is operated for 24 hours, is estimated at 110,500 MMBtu per day. Assuming that the supplemental duct-firing capability is operated for an average of 6 hours per day for 180 hours per year, the plant fuel requirement is estimated to be 28.8 BCF per year.

The length and size of the gas pipeline is approximately 12 miles of 20 inches pipe. Location of the inlet to the pipeline is at the Mitchell/Devon gas processing plant west of the City of Bridgeport. At the inlet there will be two tie-ins; one with Mitchell/Devon, and the second with the Northern Gas Pipeline owned by Kinder Morgan. The pipeline pressures at the gas yard are 550 psi, and will require gas compression between the gas processing plant and the Jack County plant site. A third gas interconnection is being evaluated at the site with Texas Utilities Fuel Company (TUFCO). This line is connected to an underground storage facility 4 miles west of the plant site. Compression is required so that gas can be transported on the TUFCO 850 psi pipeline to the Falcon underground storage facility and to maintain the specified gas pressure for the combustion turbines. Gas compression will consist of two 100% gas compressor to increase the pressures from 450 psi up to 950 – 1000 psi. The compressor station will be designed will variable speed drive motors for better efficiency and control.

2.8.2 Water and Wastewater

Raw water for the proposed plant will be supplied from Lake Bridgeport and from the City of Bridgeport Wastewater Treatment Facility

Raw water will be supplied from two sources, lake water and gray water (treated sanitary wastewater). To operate the unit in a non-ducted fired mode Brazos Electric has contracted to purchase from the Tarrant Regional Water District 3.8 MGD of water from Lake Bridgeport. To operate the unit in a full-duct fired mode and addition 1.3 MGD of water is required to operate in a peaking mode for 5 hours. This

additional water will come from recycled water from the "Zero Liquid Discharge" (ZLD) system and effluent water from a local municipality.

2.8.3 Water Balance and Process Flow Diagram

The Water Treatment System Block Flow Diagram is shown on drawings no. 898917-0-WB-4-FD-4 and 898917-0-WB-4-FD-5. The flowrates shown on the block flow diagrams depict average flows in gallons per minute for the conditions given.

The Process Flow Diagram is depicted on drawings no.06898917-1-ME-4-FD-04, 06898917-1-ME-4-FD-05, 06898917-1-ME-4-FD-06, and 06898917-1-ME-4-FD-07.

The following operating cases are considered for estimating water balance calculations.

1. Winter Average: 5 months (short days & long nights)
1(a) 3 months of winter with no duct firing and no fogging
1(b) 2 months of winter with full duct firing 8 hrs/day and no fogging

2. Summer Average: 7 months (long days & short nights)
2(a) 4 months of summer with full duct firing 8 hrs/day and fogging
2(b) 3 months of summer with no duct firing and no fogging

3. Summer Maximum Average
(Note that at this condition 708 gpm of raw water is drawn from the Raw Water Storage Pond lowering the level. This condition occurs for 8 hours per day.)

Bidder to confirm/verify the water quantity and quality requirements for the proposed ZLD system(s) at the specified operating conditions.

2.8.4 Zero Liquid Discharge System Description

The Raw Water Storage Pond will provide to blend and equalize the different raw water sources and to serve as an onsite supply of raw water. For those times when the instantaneous raw water demand is greater than the rate at which raw water is being supplied, then the shortfall will be made up from the Raw Water Storage Pond. Biocide is fed and maintained to the Raw Water supply to control biological growth in the Raw Water Storage Pond.

Makeup Clarifier

The Makeup Clarifier and Gravity Filter is smaller in the ZLD option because of the water recovered by the ZLD system. The Makeup Clarifier shall be a 75 ft diameter x 16 ft high solids contact type clarifier provided to reduce the level of hardness and suspended solids going to the cooling tower. The clarifier

shall be a system complete with all internals and chemical feed subsystems including coagulant, polymer, lime, and acid feed systems. The clarifier basin and sloped bottom shall be of concrete construction.

Coagulant Feed System

Coagulant is required at the clarifier to help settle suspended solids. The coagulant feed system shall be designed for bulk chemical delivery and include bulk storage tank with truck unloading facilities, two (2) 100% metering pumps, instrumentation, and controls. Coagulant is automatically fed proportional to the clarifier inlet flowrate.

Polymer Feed System

Polymer is used to enhance floc formation and increase solids settling rates. The polymer feed system shall be designed for chemical delivery in chemical vendor supplied returnable/portable chemical tanks. The system shall include two (2) 100% metering pumps, calibration column, pulsation dampener, instrumentation and controls.

Lime Feed System

The lime feed system shall provide lime to both the Makeup Clarifier and the ZLD Clarifier and consist of a dry lime silo with truck loading facilities, bin activators, volumetric feeder, and slurry preparation tank with mixer. The lime feed system shall include two (2) 100% slurry recirculation pumps plus pH based automatic dosing controls, instrumentation, and all needed accessories. The lime slurry line shall loop near to both clarifiers and back to the slurry feed tank. Automatic lime dosing valves shall be located as close as possible to the respective clarifiers. Automatic water flushing to prevent slurry line pluggage shall be included. Water flushing shall include the complete slurry line from the pump suction through the feed line exit into the clarifiers.

Acid Feed System

Acid is fed at the outlet of the clarifier to reduce the occurrence of post precipitation in the filters. A separate acid mixing tank shall be included at the outlet of the clarifier to allow adequate time for the acid to fully mix and stabilize. The acid feed system shall be automatic for consistent pH control. The system shall use 93% sulfuric acid and include a bulk storage tank with truck unloading facilities, metering pumps, pulsation dampener, instruments, and controls. The bulk acid storage tank shall serve the Makeup Clarifier System, and the ZLD Clarifier System. Two (2) 100% acid metering pumps with suitable metallurgy distribution system shall be provided for each acid service.

Makeup Gravity Filter

Multi-celled multi-media concrete gravity filters (4 cells, each 16' x 16') are provided after the acid mixing tank to remove suspended solids that may have carried over from the clarifier and to protect

downstream systems from upsets in the clarifier. Two (2) 100% air blowers shall provide air scour assistance during filter backwashes. Water from the filters flows by gravity to a below grade concrete clearwell sump sized to hold water for two filter backwashes plus 30 minutes of plant operation at maximum flowrate. The clearwell sump supplies treated water for cooling tower makeup, as well as filter backwash, and other treated water needs within the plant.

Clarifier Underflow and Gravity Filter Backwash

Sludge accumulated in the clarifier is periodically removed from the clarifier by blowdown. The removed sludge, or underflow, flows by gravity to the Filter Backwash Sump. Sump pumps forward the sludge to the Thickener. Control of the clarifier blowdown is from adjustable timers.

Backwash wastewater from the gravity filters is also routed to the Filter Backwash Sump. Controls are interlocked to allow only one filter cell to backwash at a time. Controls are also interlocked such that before a filter backwash begins the clarifier blowdown cycle is interrupted and the blowdown sump pumps are started to pump down the sump to it's lowest level. The Filter Backwash Sump is provided with an internal partition wall having an adjustable overflow weir. The internal wall divides the sump into "sludge" and "clean water" compartments. The elevation of the weir in the dividing wall is selected such that the first two minutes of a filter backwash will be retained in the sludge side of the blowdown sump. At this level all backwash water entering the sump after the first two minutes of a backwash will overflow the weir into the "clean water" side of the sump. Since this last portion of the backwash water is comparatively clean it is recycled to the clarifier inlet at a controlled rate of less than 10% of the clarifier throughput by the backwash recycle pumps. After backwash the clarifier blowdown sequence is returned to its normal operation. The clean water compartment of the sump is sized to hold two consecutive backwashes. A mixer is provided in the blowdown sump to keep the heavy sludge particles suspended. Backwash wastewater in the sludge side of the sump is routed to the Thickener. The Filter Backwash Sump serves as a common sump for the Makeup clarifier/Makeup Gravity Filter and the ZLD Clarifier/ZLD Gravity Filter Systems.

Thickener

The 40 ft dia. thickener shall be constructed as a concrete tank with concrete bottom. All piping, fittings, and equipment required to dewater sludge shall be included. Thickener overflow shall be directed back to the filter backwash sump to be recycled to the clarifier inlet.

Sludge Dewatering

Sludge from the Sludge Thickener is transferred to the Plate and Frame Sludge Dewatering System where the sludge is dewatered and placed in a dumpster for transport to offsite disposal.

Filter Press

Two (2) 100% sludge pumps shall be provided to transfer sludge from the Thickener to the Filter Press. The sludge pumps shall be air diaphragm type pumps. Filtrate shall be directed back to the backwash sump for return as makeup to the clarifier. The filter press shall be sized to process the maximum daily sludge quantity from the Thickener in one 8-hour shift. Filter press operation shall proceed automatically from operator initiation. The filter press shall be designed to allow dry cake to drop into a standard size dumpster (10 to 20 yd^3 capacity).

ZLD Clarifier

Blowdown from the HRSGs combined together with blowdown from the main cooling tower and treated water from the oil-water separator is collected in a 400,000 gallon Blowdown Storage Tank. Water from the Blowdown Storage Tank is fed at a controlled rate to the concrete ZLD Clarifier and Gravity Filters for removal of suspended solids and hardness, etc. in preparation for the downstream treatment systems. As with the Makeup Clarifier, 93% sulfuric acid is fed to a separate acid mixing tank at the outlet of the ZLD Clarifier to reduce the occurrence of post precipitation in the filters. Similar to the Makeup Clarifier, sludge accumulated in the ZLD Clarifier is periodically removed by blowdown to the ZLD Filter Backwash Sump. Sump pumps forward the sludge to the common Thickener. Control of the clarifier blowdown is from adjustable timers. A mixer is provided in the blowdown sump to keep the heavy sludge particles suspended.

ZLD Coagulant Feed System

Coagulant is required at the clarifier to help settle suspended solids. The coagulant feed system shall be designed for bulk chemical delivery and include bulk storage tank with truck unloading facilities, two (2) 100% metering pumps, instrumentation, and controls. Coagulant is automatically fed proportional to the clarifier inlet flowrate.

ZLD Polymer Feed System

Polymer is used to enhance floc formation and increase solids settling rates. The polymer feed system shall be designed for chemical delivery in chemical vendor supplied returnable/portable chemical tanks. The system shall include one (1) 100% metering pump, calibration column, instrumentation and controls.

ZLD Lime Feed System

Lime feed to the ZLD Clarifier is common with the Makeup Clarifier system.

ZLD Acid Feed System

Acid feed to the ZLD Clarifier is common with the Makeup Clarifier system.

ZLD Gravity Filters

The ZLD Gravity Filters are multi-celled, multi-media filters provided downstream of the acid mixing tank to remove suspended solids that may have carried over from the ZLD Clarifier and to protect the downstream systems in the event of an upset in the clarifier. Similar to the Makeup Gravity Filters backwash wastewater from the ZLD Gravity Filters is routed to the ZLD Filter Backwash Sump. The first two minutes of backwash water are collected in the sludge side of the sump and forwarded to the Thickener. The remainder of the backwash water is collected in the "clean water" side of the sump and recycled to the clarifier inlet at a controlled rate of less than 10% of the clarifier throughput by the backwash recycle pumps. The clean water side of the sump is sized to hold two consecutive backwashes. A mixer is provided in the sludge side of the sump to keep the heavy sludge particles suspended.

ZLD Softeners

The ZLD Softeners are provided to remove remaining hardness in the ZLD Clarifier effluent because even low levels of hardness can be detrimental to the downstream RO membrane system. Two (2) 100% softeners shall be provided complete with all required regeneration equipment.

RO Units

The High Recovery Membrane System is a Reverse Osmosis (RO) based system complete with all pretreatment equipment, filters, pumps, tanks, chemical feed systems and controls required to operate at high product recovery rates. The system will be designed to minimize the occurrence of scale or fouling within the RO membranes while maximizing the concentration of dissolved solids in the feed to the Crystallizer System. RO product and recovered water from the Crystallizer system are collected in the 30,000 gallon Recovered Water Tank. A complete chemical cleaning system sized to clean one complete RO skid at a time shall be provided for the High Recovery Membrane System. Membrane cleaning wastes shall be suitably collected and stored for subsequent disposal.

Bypass Storage Tank

A 105,000-gallon Bypass Storage Tank is provided for temporary storage of wastewater during Crystallizer system maintenance. A hose connection is provided at the Bypass Storage Tank to facilitate offsite disposal of wastewater by tanker truck, if needed. Bypass and isolation valving, pumps, etc. shall be included in the design for processing the stored water, in addition to normal flows, through the crystallizer within one week.

Crystallizer

A Crystallizer System is provided to treat the concentrated brine stream from the High Recovery Membrane System plus ion exchange regeneration wastes. The Crystallizer shall be a forced circulation

type system using steam for heating. The Crystallizer system shall be constructed of suitable metallurgy without rubber lining. A plate and frame type feed/distillate heat exchanger shall be provided to preheat the feed against recovered hot distillate and condensate. The Crystallizer System shall include all pumps, heat exchangers, vacuum pumps, tanks, conditioning tanks, chemical feed systems, filters, dewatering devices and controls required to reduce the Crystallizer feed water streams to a dry solids waste suitable for offsite disposal. The Crystallizer shall be provided with a crystallizer feed tank to properly condition and control the feed to the crystallizer vessel.

Antifoam System

An antifoam addition system shall be provided to control foaming that may occur in the crystallizer.

Crystallizer Solids Dewatering

Suspended solids are removed from the Crystallizer system by the pressure filter. The rate of solids removed from the Crystallizer is controlled to maintain the desired crystal density within the Crystallizer. The water treatment systems shall be operated from a stand alone PLC based control panel using touch screen man/machine interface technology. All communication from the PLC to the DCS shall be provided for historical data trending. Modifications to the scope of work and the major equipment items required to implement the ZLD option.

Process Requirements

Raw water from Lake Bridgeport shall be supplied at a maximum rate of 2660 gpm. Additional raw water will be supplied from municipal gray water as needed and as available, and as shown on the Block Flow Diagram. The Cooling Tower Makeup Treatment System and the ZLD Treatment System shall be designed to operate together to maintain a maximum chloride concentration as ion in the main cooling tower circulating water of 1000 ppm. The maximum Total Dissolved Solids (TDS) concentration measured in ppm in the main cooling tower circulating water shall not exceed that set by requirements of the Air Permit. Clarifier effluent shall be consistently less than 10 ppm total suspended solids (TSS), at the Gravity Filter inlet. Effluent from the Gravity Filters shall not exceed 1 NTU. The ZLD Gravity Filters shall produce water at less than 5 SDI suitable for the downstream RO system. Gravity Filter service runs shall be a minimum of 24 hours between backwashes. Filters shall be back washed with clarified and filtered water. Only one filter cell shall be back washed at any one time. Filter backwashes shall be accomplished without any interruption to the system total throughput. Dewatered solids from the filter press shall be at least 30% dry cake. At least 90% of the water in the clarifier blowdown and filter backwash streams shall be recovered and recycled to the inlet of the makeup clarifier. The rate of recycle shall be controlled to not exceed 10% of the makeup clarifier throughput. The sludge thickener and filter press dewatering systems shall be common for both the Makeup Clarifier and the ZLD (zero liquid discharge) Clarifier systems. The system shall maintain the cooling tower circulating water quality Silica, Hardness, Chlorides, Sulfates, and Total Dissolved Solids at levels to prevent scale and corrosion when

standard treatment chemicals at minimum feed rates are used with no adverse impact on the system wetted parts manufactured of 316 stainless steel.

Major Equipment Items

- Biocide Feed System
- Raw Water Storage Pond
- Makeup Clarifier & Chemical Feed System(s)
- Makeup Gravity Filter(s)
- Clearwell
- Sludge Thickener
- Plate & Frame Sludge Dewatering System
- Filter Backwash & Clarifier Blowdown Sump
- Boiler Feedwater Treatment System (Demineralizer)
- Blowdown Storage Tank
- ZLD Clarifier & Chemical Feed System(s)
- ZLD Gravity Filter(s)
- ZLD Treatment System & ZLD Chemical Feed System(s)
- Recovered Water Storage Tank
- Crystallizer System
- Bypass Storage Tank

Equipment Requirements

Solids contact type clarifiers shall be designed for a minimum rise rate of 1.0 gpm/sq ft when measured at 4 ft below the operating liquid level with a retention time of 120 minutes. Minimum running torque shall be 70,000-ft lbs for solids contact clarifier drives and 50,000 ft lbs for the thickener drives. Sludge thickener shall be sized to hold one-week sludge produced at maximum flow rate and sufficient freeboard for decant water to over flow by gravity to the sludge sump. The Makeup Clarifer, Makeup Gravity Filters, ZLD Clarifier, ZLD Gravity Filters, and Sludge Thickener shall be located nearby each other and provided with a common platform/walkway between them for ease of operator movement between the units. The platform/walkway shall be provided with at least two access stairways. The solids contact clarifiers shall be complete with concrete tank and sloped bottom, inlet flow control valve, plus all internals, including double sweep rake and drive, flocculation drive, drive controls, torque indicators, sludge removal & flushing systems, drain valves, sample valves, and sample sink. Thickener rake and drive shall be suitable for thickening a heavy lime softening sludge. Thickener shall maintain positive

rake torque with constant speed drive with motor (reversible by switch in drive), torque indicator, bearings, gears, 2-rake arms with blades and thickening pickets. No underwater bearings shall be used for clarifiers or thickeners. Clarifier and thickener rake drives shall be a fully enclosed completely shop assembled units. The thickener shall be capable of storing sludge for up to 7 days based on 5% consistency of the stored sludge at maximum operating conditions.

Gravity Filters

Multimedia gravity filters shall be concrete and sized for 3.8 gpm /sq ft surface loading with all filters in operation and 5 gpm/sq ft when one filter cell is in backwash mode. Filters shall be provided with air scour system for backwash assistance. Each filter or filter cell shall be provided with inlet rate of flow control distribution system including splitter box, piping, and pneumatic operated automatic valves. Gravity filters shall be of flat false bottom design with strainers suitable for uniform and equal air distribution throughout the filter. Filters shall have a minimum of two FRP inlet-backwash outlet troughs for each cell. Underdrains shall be constructed of GRC monolithic false distributor floor slab material with polypropylene strainers. Strainers shall be provided at a minimum of 4 per square foot or equivalent. Gravity filter false bottom anchoring and side supports shall be 316 SS material. Gravity filters shall be designed for automatic backwashing and return to service, with backwash initiated based on high pressure drop across the filter bed measured in terms of increase in water level in the filter cell and/or filter throughput.

Filter Press

The dewatering filter shall be located in a building with space suitable for placing a dumpster beneath the filter to receive the dewatered solids. Temperatures in the building shall be controlled as needed to protect the sludge dewatering equipment. Provision for warm-up water (service water) supply to the filter press shall be included to allow warming, when required, of the unit prior to start of operation. A temperature indicator shall be supplied for the slurry inlet line to the filter press.

Boiler Feedwater Treatment (Demineralizer)

The Boiler Feedwater Treatment system shall be an ion exchange cation, anion, mixed bed system using packed bed technology. The cation and anion exchangers shall be designed for down flow service and up flow regeneration. A Sodium Sulfite injection system shall be included with the Boiler Feedwater Treatment Demineralizer system to protect exchange resins from chlorine damage. Sulfite dosage rates shall be automatically controlled based on continuous oxidation reduction potential (ORP) measurement system. A hot water tank shall be provided to produce hot water for SBA and Mixed Bed anion resin regeneration. The hot water tank shall be supplied with an electric insertion type heater capable of heating a full tank from 70 degrees Fahrenheit (°F) to 120 °F in 6 hours. A hydrometer pot shall be provided for manual check of each chemical concentration in the demineralizer regeneration systems. Drains from the hydrometer pot shall be routed to a safe location.

Reverse Osmosis System

RO equipment shall be sized to produce the design flowrate at the coldest design temperature.

Chemical Feed

All chemical feed systems shall include automatic speed/stroke injection pumps, feeders, strainers, mixers, controls, instruments, pump discharge pressure switches, and piping, etc. required to meet the performance guarantees. Bidder shall provide bulk storage and unloading facilities for commodity chemicals. Appropriate spill containment and control facilities shall be provided for chemical unloading and storage areas. Each chemical tank or dry storage silo shall have a minimum operating capacity of 7 days at maximum design usage rates or 2 times the delivery truck volume, whichever is larger. Facilities where specialty vendor supplied chemicals are used shall be designed for chemical delivery in chemical vendor supplied returnable/portable tanks.

Other

The Raw Water Storage Pond shall be designed to minimize short circuiting within the pond and to minimize the ingestion of floating material by forwarding pumps. Blowdown from the cooling tower will contain treatment chemicals such as scale & corrosion inhibitors, biocide, phosphate, and dispersants, etc. The Zero Liquid Discharge treatment system performance shall be guaranteed taking into account the presence of these above mentioned treatment chemicals. Piping arrangements for lines in slurry service shall be designed to minimize "dead leg" connections. Pumps in slurry service shall be provided as one (1) 100% capacity installed pump with one (1) 100% capacity warehouse shelf spare. The High Recovery Membrane System and the Boiler Feed Water Treatment System shall be located in a heated and ventilated building. The bidder shall provide a complete system including all equipment, pumps, tanks, vessels, controls, buildings, concrete, wiring, lighting, etc. Bidder shall design their systems to maximize the recycle and re-use of all recoverable waste streams such as backwash water, RO brine, supernatant from the thickener and filtrate from the de-watering units. The atmosphere around ZLD equipment tends to be corrosive, therefore, the materials of construction for all equipment including bolts, screws, hand levers, and handwheels, etc. shall be selected to resist corrosion to ensure long equipment life.

2.8.5 Bidder Information Requirements

In addition to other bid requirements the bidder shall provide projected chemical and utility consumption rates plus estimated solid waste production rates. Rates shall be reported as daily values based on the Summer Maximum Average condition and as yearly values based on the 5-month-winter-7-month-summer operation. Consumption rates shall also be reported for utilities including power, instrument air, cooling water, and steam. The bidder shall include in his proposal a description of his plan for disposal of chemical cleaning wastes such as RO membrane cleaning wastes and resin conditioning wastes. The bidder shall provide all design information for proper technical evaluation as determined by the owner.

Suggested Vendors

- U S Filter
- Aqutech International Corporation
- Ecodyne Limited
- Water & Power Technologies Inc.
- Ondeo Degremont Inc.
- Ionics/RCC

2.8.6 Electric Transmission

The exact electric transmission requirements for any given site can only be determined after it has been submitted to ERCOT and analyzed as part of a full generation interconnection study. The Preliminary Transmission Analysis has been completed and submitted as of March 17, 2003.

Connection of the proposed plant to the existing electrical grid could be provided from either 138-kV or 345-kV transmission facilities or a combination of both. Connection to the grid could be provided from either BEPC or ONCOR transmission lines in the area. Any significant new transmission lines required to connect the proposed power plant to the existing grid would need to receive a Certificate of Convenience and Necessity (CCN) from the Public Utility Commission of Texas (PUCT). Table 2-1 is a list of potential transmission line projects associated with the proposed generation plant.

2.9 REQUIRED ENVIRONMENTAL PERMITS

Table 2-2 presents a summary of the various environmental permits that may be required for the proposed Jack County Power Plant Project. Information provided in the table includes the potential permit, authorization or clearance; the issuing agency; action required; estimated schedule to receive approval; and comments.

Table 2-1
Transmission Projects Associated with New Generation Plant

Number	Transmission Projects	Length (miles)	Structure Type	Span Length	Structures per Mile	Disturbance per Structure	Access Roads Required	New R.O.W	Length of New R.O.W. (miles)	CCN/Exemption
1	Generation Plant - Oncor's Bridgeport	15.0	Single Pole	500-700 ft.	9	3 sq. yards	No/Minimal	Yes (Net 70 ft.)	15.0	CCN
2	Generation Plant - Joplin	2.4	Single Pole	500-700 ft.	9	3 sq. yards	No/Minimal	Yes (Net 10 ft.)	*2.4	(CCN) Exemption Report
3	Generation Plant - Cottondale Switch[1]	5.2	Single Pole	500-700 ft.	9	3 sq. yards	No/Minimal	Yes (Net 110 ft.)	*5.2	CCN
4	Generation Plant - Willow	8.4	Single Pole	500-700 ft.	9	3 sq. yards	No/Minimal	Yes (Net 70 ft.)	**8.4	CCN
5	Carter - Carter Switch[3]	4.0	Single Pole	500-700 ft.	9	3 sq. yards	No	Yes (Net 10 ft.)	*4.0	(CCN) Exemption Report
6	Generation Plant - Cottondale Switch[2]	5.2	Single Pole	500-700 ft.	9	3 sq. yards	No	No	NA	Exemption Report
7	North Texas - Cottondale Switch	26.8	Single Pole	500-700 ft.	9	3 sq. yards	No	No	NA	Exemption Report
8	Bowie - Cottondale Switch	39.7	Single Pole	500-700 ft.	9	3 sq. yards	No	No	NA	Exemption Report
9	Cottondale Switch - Reno	18.9	Single Pole	500-700 ft.	9	3 sq. yards	No	No	NA	Exemption Report
10	Rhome - Chisholm - Rhome Switch Reconductor	5.3	Single Pole	500-700 ft.	9	3 sq. yards	No	No	NA	Exemption Report

* parallels existing Brazos R.O.W
** parallels existing Oncor 345 ROW
[1] New Line
[2] Rebuild
[3] Potentially Not Required to be Rebuilt

TABLE 2-2

SUMMARY OF ENVIRONMENTAL PERMITTING REQUIREMENTS

Regulated Area	Requirements	Issuing Agency	Action Required	Operationally Required By	Estimated Procurement	Comments
AIR QUALITY	General application for construction permits and amendments	TCEQ	Form 10400 Form PI-1, BACT Analysis Table PSD-1	Prior to start of construction	9–12 months	Incorporates NSR, construction dust control plan, PSD evaluation and minor source reviews under RACT standards.
	Title IV Acid Rain Permit	TCEQ/EPA	Form OPAR-1; Form OP-1 Form OP-CRO-1; Amend Certificate Of Representation	Prior to plant operation	24 months	Application for CEMS Certification as per Title IV permit
	Title V Federal Operating Permit	TCEQ/EPA	TCEQ FOP permit application	Prior to plant operation	12–24 months	Incorporates conditions for CEMS Certification application
	Risk Management Plan	N/A	See comments	See comments	See comments	Only required for emission of Hazardous Air Pollutants greater than 40 CFR Part 68 thresholds
WATER & WASTEWATER	Storm Water Construction General Permit (CGP) or TPDES CGP	EPA-through 7-7-2003 or TCEQ after 7-7-2003	• Develop storm water pollution prevention plan (SWPPP) • Performance Endangered Species Act(ESA) • Certification process. • Complete and submit Notice of Intent (NOI) form to apply for permit coverage.	Submit 48 hours prior to commencement of construction activity	Effective 48 hours after NOI postmark	Complete a Notice of Termination (NOT) form to discontinue permit coverage if final site stabilization has been achieved.
	TPDES Wastewater Discharge Permit	TCEQ	Submit permit application as per Form TCEQ – 10411/10055	Upon discharge of Industrial Waste Water	462 days	
	Industrial Storm Water Permit	TCEQ	File Notice of intent TCEQ	End of Construction and prior to start-up	See comments	Applicability will depend on facility location and design. Will also determine necessity for SWPPP development.
	On-site Sewage Facility (OSSF) permit	County of plant site	Pay Fees – Submit plans	Time of use	30 days	State Authorization handled by county or city or TCEQ in absence of local authority
	Public Drinking Water System I.D.	TCEQ	Retain certified water well driller	Time of use	30 days	State I.D. Number issued after authorization & completion of well
PETROLEUM STORAGE TANKS (PST)	Above Ground Storage Tank registration	TCEQ	Submit Form TCEQ-0724	Time of fuel delivery	60 days	
	Underground Storage Tank Registration	TCEQ	Submit Form TCEQ-0724	Time of fuel delivery	60 days	
U.S. ARMY CORPS OF ENGINEERS	Section 10/404 Permits	USACE	Submit Work Scope Proposal	Prior to Construction	6 months	Only required if discharging dredge or fill material or crossing waters of the U.S.
	Nationwide Permits	USACE	Submit Nationwide Permit Request	Prior to Construction	30 days	Avoidance of Wetlands & Jurisdictional 404 Water Permits
	Environmental Assessment/Environmental Impact Statement	USACE	Submit Assessment to RUS for approval	At least 30 days prior to construction	120 days	
MISCELLANEOUS	Federal Endangered Species Consultation	U.S. Fish & Wildlife Service	Presence/Absence Survey	Prior to Construction	1–3 years	Determined by site location and habitat. If not suitable habitat, no study required
	Determination of Obstruction Hazard	DOT FAA	File FAA Form 7460-1	Prior to construction	90 days	
	Cultural Resources Approval	Texas Historical Commission	See comments	Prior to construction	60 days	Submit archeological site survey to THC. If no significant findings work proceeds.

3.0 Alternatives

3.0 ALTERNATIVES

3.1 NO ACTION

With this alternative, BEPC would not receive approval of project financing from the RUS to construct the proposed facility. No on-site activities related to the construction of the proposed power plant would occur, and thus the potential environmental impacts described in Section 5.0 would also not occur. The natural, human, and cultural resources on the proposed site would likely remain as they are described in section 4.0 of this document. Under this alternative, the growing electrical demand in BEPC's system would have to be met either from other, unknown generation sources, or by power purchases from other existing remote generation sources, if available.

In Phase II of the 2002 Power Supply Study, Brazos Electric considered coal-fired generation as an alternative. The NPV and total revenue requirements for a coal-fired unit were found to be relatively comparable to those for a combined-cycle, gas-fired plant; however, the combined-cycle, gas-fired plant was recommended because of its lower installed cost, shorter time for construction, and lower environmental and regulatory risk.

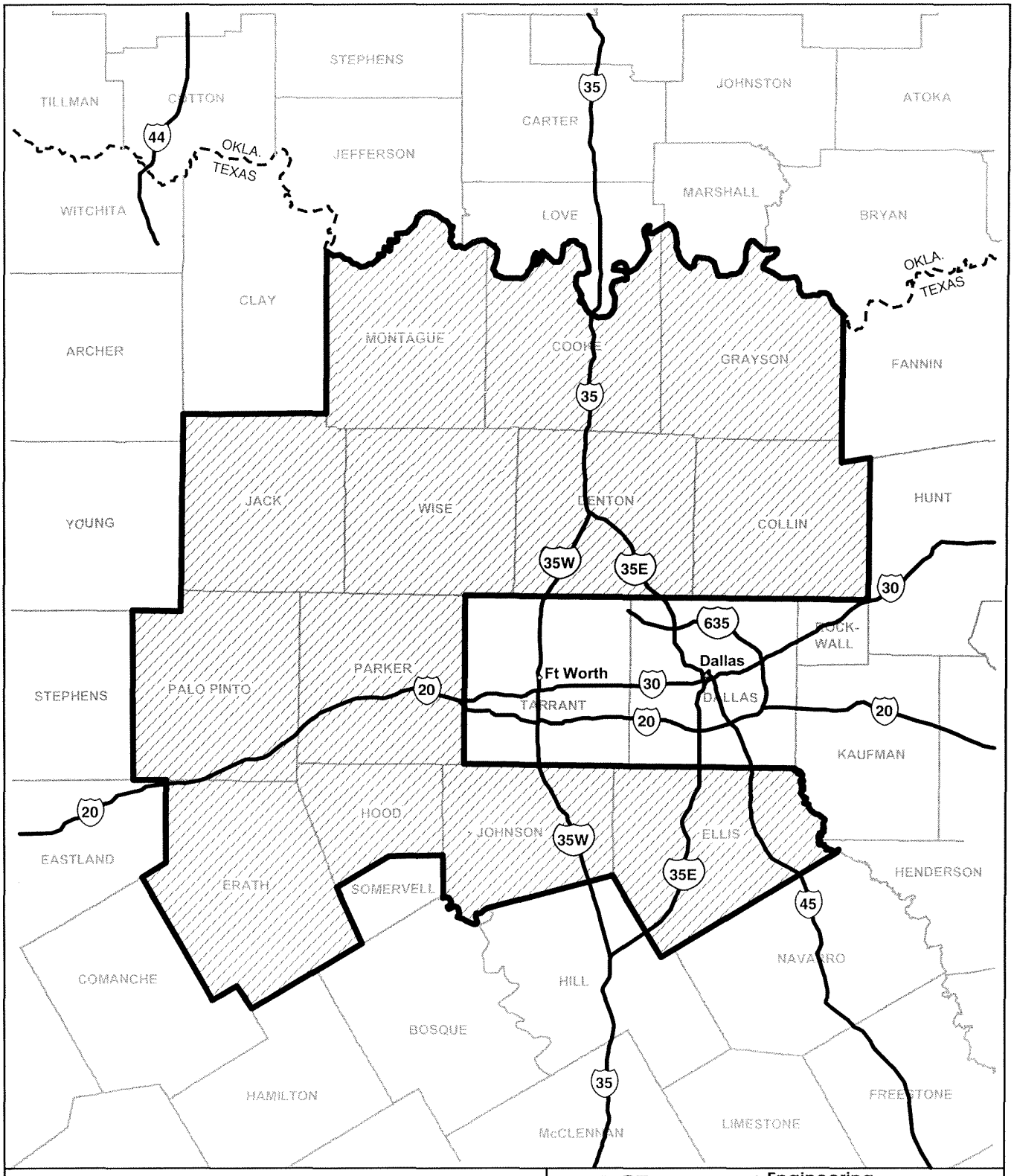
The 2002 Power Supply study did not consider wind power as an alternative because of Brazos Electric's requirements for base-load energy and summer peaking capacity. Other types of renewable energy resources and distributed generation were not considered viable alternatives because of the magnitude of Brazos Electric's capacity and energy requirements.

3.2 PROJECT ALTERNATIVES

Following their decision to include new generation as part of their response to the increasing loads in their system (see Section 2.1), BEPC hired Burns & McDonnell to perform a Site Selection Study (the Study), for the proposed new generation facility (Burns & McDonnell, 2002). This study identified and evaluated sites for up to 1,000 MW of gas-fired generation using a methodology consistent with the requirements of the RUS. While this generation could be constructed anywhere in Texas, problems with the transmission congestion make it impractical for BEPC to locate these new generating units far outside of its service territory. Therefore, the search for prospective power plant sites was limited to north-central Texas, the area served by BEPC's existing transmission system (Figure 3-1).

3.2.1 Selection of Candidate Site Areas

The first task in the siting process was to identify candidate site areas (Burns & McDonnell, 2002). These were located by giving consideration to regional environmental constraints and proximity to the necessary infrastructure for power transmission and fuel delivery. The principal environmental constraint that was considered in this project phase was the Dallas/Fort Worth non-attainment area. This non-attainment area covers all of Dallas and Tarrant counties and the southern halves of Denton and Collin counties. For



north

0 10 20 30 40 50 miles

Base Map: DeLorme

PBS&J • Engineering • Environmental Consulting • Surveying

Figure 3-1

SITE SELECTION STUDY AREA

JACK CO. POWER PLANT PROJECT

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access to the transmission grid, the search for candidate site areas was limited to areas within 10 miles of an existing transmission line with a voltage of 138 kV or higher. Areas within 20 miles of a large natural gas pipeline (12 inches or more in diameter) were included for fuel delivery to gas-fired units

This process yielded 59 preliminary site areas for a combined-cycle plant. The preliminary site areas were then subjected to a "desktop" screening process using topographic maps and aerial photographs that were downloaded from the Internet. Through this process, some of the preliminary site areas were eliminated due to potential air permitting concerns or proximity to urban areas. After the desktop screening, there were 30 candidate site areas left for a gas-fired plant.

3.2.2 Selection of Potential Site Areas

A field reconnaissance of candidate site areas was made during November 2001 by Burns & McDonnell staff with experience in power plant siting and permitting. This reconnaissance consisted of an automobile survey along public roads in the vicinity of each site area. The information collected during the field reconnaissance was used in a serious-flaw analysis. Serious flaws include:

- adverse topography;
- unattractive rail or road access;
- significant competition for available water supplies;
- urbanization; and
- adverse aesthetic impacts.

Through the serious flaw analysis, six site areas were eliminated. The remaining site areas were grouped by county and compared to the other site areas in the same county. The better site areas in each county were retained and designated potential sites areas for a gas-fired plant.

3.2.3 Selection of Preferred Site Areas

All of the potential site areas are considered to be generally acceptable power plant sites but there are still relative differences. A numerical decision analysis process was used to rank the potential site areas to identify BEPC's best development options. The first step in this process was to identify the criteria used to evaluate the potential site areas. These criteria are not all equivalent in their importance so each criterion was also assigned a relative weight. The evaluation criteria and their weights are listed below.

- Air quality impacts (4)
- Electrical transmission (10)
- Fuel supply (10)
- Heavy equipment delivery (2)

- Public impacts (5)
- Water supply

A numeric score between zero and ten was assigned to each potential site area for each criterion. For some criteria, the rationale used to assign these scores varies depending on the total site capacity (500 or 1,000 MW). These individual criterion scores were multiplied by their respective weights and summed to yield a weighted composite score for each site area. These composite scores were then used to rank the site areas. The resulting site rankings and weighted composite scores indicated that there were four top-ranked, or preferred sites. Among these sites, BEPC felt that two (Boonsville and Bridgeport) represented the best opportunities for siting the proposed facility.

3.2.4 Conclusions

The conclusions reached as a result of the investigations and evaluations conducted during this study were as follows:

- The existing air quality at all of the potential site areas is such that obtaining an air emission permit should not be exceedingly difficult.
- It appears unlikely that conflicts with protected species will be a significant concern at any of the potential site areas given the types of habitat available.
- A cultural resources survey will be required before development is allowed at a site to determine the existence of any significant historic or prehistoric artifacts. If such artifacts are discovered, it is likely that their disturbance can be successfully mitigated to allow development.
- It appears unlikely that plant development would result in significant wetland impacts at any potential site area.
- To accommodate transmission of electricity from the proposed generation facility, the proposed power plants will likely be connected into the BEPC electric system. Development at most of the potential site areas will require some transmission improvements.
- Although each of the potential site areas is located near one or more large natural gas pipelines, this does not guarantee that the proposed site will have a reliable supply of natural gas. The pipelines may not have the requisite delivery capacity or pressure.
- Some of the potential site areas may require significant additional investment in new natural gas pipeline facilities in order to accommodate 500 MW or 1,000 MW of generation.
- Since the planned combined-cycle generating units are targeted for base load service, they will have a high capacity factor. Firm natural gas delivery may be unavailable at all times, particularly during the peak winter heating season. Therefore, a single interruptible natural gas delivery contract may not be acceptable for these generating units. Due to the rapid pace of residential and commercial development in the Dallas/Fort Worth metropolitan area, the length or frequency of these interruptions are likely to increase in the future. Therefore,

multiple interruptible natural gas delivery contracts are recommended to fuel the generating units if a firm contract is unavailable.

- The water requirements of the proposed combined-cycle generating units are relatively high. The most practical water supply at most of the potential site areas will come from surface water. Surface water is available for all of the potential site area but may require construction of lengthy pipelines for delivery in some cases. Delivery of water from surface water sources will require construction of water intake structures, pipelines, and pumping stations.
- Groundwater may be potential water source at some site areas. A groundwater investigation and possible pilot test may be necessary to ascertain groundwater availability, quality, and dependability.
- These water requirements would be significantly decreased by utilizing a different technology for condenser cooling. The use of an air-cooled condenser would increase the feasibility of developing an on-site or nearby water source, such as a groundwater well field. This would also reduce construction and operating costs for ancillary facilities such as intake structures, pipelines, pumping stations, and storage ponds.
- Within the project study area, 13 site areas with fair development potential for a combined-cycle generating facility were identified. These site areas are distributed by county as follows: one in Grayson county, one in Montague County, three in Wise County, two in Jack County, one in Parker County, one in Palo Pinto County, three in Erath County, and one in Ellis County.
- Of the 13 potential site areas, comparative analysis revealed the four most attractive sites for a combined cycle plant were Boonsville, Bridgeport, Maypearl, and Whitewright. These four site areas were designated preferred site areas, and were ultimately narrowed down to three (including Boonsville and Bridgeport), which BEPC carried forward as their preferred sites.

3.2.5 Utility Alternatives

3.2.5.1 Natural Gas Supply

One or more natural gas pipelines and interconnection/metering facilities with one or more gas transportation entities would be required for the project. One pipeline could be constructed in the ROW with the water pipeline. Additional pipelines could be routed along transmission line ROW.

The proposed plant site is located in a natural gas producing region of North Texas. BEPC has determined that transportation services are available from at least three gas transportation entities, and fuel supplies and transportation are available from at least one gas gatherer/producer. These entities have high-pressure gas pipeline facilities within 15 miles of the proposed plant site.

These gas transportation entities have the following capabilities:

Entity	Production	Transportation	Storage
TXU Lone Star		Yes	
TXU Fuels		Yes	Yes
Natural Gas Pipeline Co. of America		Yes	Yes
Devon	Yes	Yes	

From discussions with potential natural gas transportation suppliers, BEPC has determined that firm transportation service is available from at least two potential suppliers. One transportation suppler, TXU Lone Star Pipeline, will not provide firm transportation but may offer "Priority" Interruptible Service to customers that commit to annual minimum delivery quantities. TXU Lone Star explained that their pipeline facilities were constructed to serve retail and commercial customers, and those customers have first rights to use the facilities.

BEPC intends to evaluate the following in developing a fuel supply plan for providing for the fuel requirements of the project:

1. A combination of firm and interruptible transportation agreements, preferably with two or more gas transportation entities.
2. Combinations of annual and/or multi-year indexed gas supply agreements for specific volumes, and spot purchases of daily and/or monthly volumes to supply the project's physical fuel requirements.
3. Gas storage agreement(s).
4. A risk management plan for utilizing financial market products (gas futures contracts and options, basis contracts, etc) for management of price and volatility risks.
5. A stand-by fuel supply such as propane or compressed natural gas.

BEPC plans to obtain services from a consultant with expertise in fuel supply management. BEPC recently became a member of ACES Power Marketing to provide such services.

Devon Gas Services

Devon operates a gas gathering system that collects and delivers gas to the Devon/Liquid Energy processing plant located on US 380 west of the City of Bridgeport in Wise County, Texas. Devon owns the Acacia "header" gas pipeline between the Bridgeport plant and interconnections with TXU Lone Star's and El Paso Field Services' 36-inch pipelines at Morgan Mill in Erath County, north of Stephenville. Devon also delivers gas to NGPL at the outlet of the plant.

Devon recently expanded the Bridgeport plant to accommodate gas production from the Barnett Shale formation. Devon estimates they have more than 250,000 MMBtu/day of gas at the Bridgeport plant.

Devon is anxious to sell gas in the Bridgeport area, but wants to deliver gas at a constant rate.

Natural Gas Pipeline Company of America (NGPL) (owned by Kinder Morgan)

NGPL's pipeline connects to the outlet of Devon's Bridgeport processing. The line is part of NGPL's Amarillo System and is in their Midcontinent Rate Zone. NGPL offers firm transportation and storage, but their ability to provide swing service might be limited since the Bridgeport area is at the end of a radial portion of their system.

TXU Lone Star Pipeline

TXU Lone Star Pipeline operates a 16-inch gas pipeline (designated Line W) in central Wise County. TXU also operates an 18-inch pipeline in northern Parker County. TXU Lone Star's system experiences high demands during cold weather periods, and availability of transportation service depends on the source of gas. TXU Lone Star does not provide firm transportation service because of their commitment to provide service to residential and commercial customers served by TXU Gas, their LDC affiliate. TXU Lone Star can provide "priority" interruptible transportation service.

TXU Fuel Co.

TXU Fuel Company ("TXUFCO") operates a 16-inch pipeline in southern Wise and Jack Counties. A TXUFCO Fuel 8-inch pipeline that runs through the Jack County plant site connects to the 16-inch line, south of the Jack County site.

TXU Fuel offers firm transportation service.

Falcon Gas Storage

Falcon Gas Storage ("Falcon") owns a gas storage facility at Worsham Steed in southeastern Jack County. Falcon recently purchased the facility from TXUFCO, but has not placed it in operation. Worsham Steed connects with the TXUFCO 16-inch pipeline.

When operated by TXUFCO, the storage facility was capable of injecting or withdrawing 60,000–70,000 mcf/day. Falcon hopes to ultimately upgrade the facility to allow injections or withdrawals of 200,000 mcf/day. When contacted in November 2002, Falcon was attempting to arrange for "pad gas" to satisfy the minimum pressure required for operation. Falcon expressed a willingness to offer reduced rates in exchange for an entity financing a portion of the required "pad gas." This option will be used versus dual fuel backup (oil).

3.2.5.2 Electric Transmission Lines

Introduction

The following constitutes a report on the results of a preliminary transmission analysis concerning three gas generation sites proposed in the Burns & McDonnell Power Plant Site Selection Study dated December 2001. The three potential sites are Boonsville, Jack County, and Bridgeport. For purposes of this preliminary report, the Boonsville and Jack County Sites are considered to have the same transmission solution since both sites are physically in proximity to each other. The stated transmission requirements in this report for each of the sites are considered as preliminary. The exact transmission requirements for a given site can only be determined after it has been submitted to ERCOT and analyzed as part of a full generation interconnection study.

The process has begun of completing a full interconnection study for the Jack County Site. The generation interconnect request has been submitted to ERCOT. The steady sate transmission portion of the study has been completed and submitted to ERCOT and the North Texas Regional Planning Group (NTRPG) for comment. This study recommended the 138-kV solution as outlined under the 'Jack County and Boonsville Plant Sites' section of this document (following Introduction in Section 3.2.5.2). This recommendation has received favorable comments from ERCOT and no dissenting comments from members of the NTRPG. The stability and short-circuit portions of the generation interconnect study have begun and will be completed by the end of May 2003.

Jack County and Boonsville Plant Sites

Both of these sites are located within approximately 4 miles from each other. The Jack County Plant Site is located in the southeastern corner of Jack County. Boonsville is in the southwest corner of Wise County. Connection to the grid could be provided from 138-kV or 345-kV transmission facilities or a combination of both. One major advantage of these two sites over the Bridgeport Site is the potential to install additional generation without requiring extensive new rights-of-way for transmission lines. The required improvements are dependant on the proposed Jacksboro Switch to West Denton 345-kV line being in service. The Jacksboro Switch to West Denton line is under consideration by ERCOT but has not been submitted to the ERCOT regional planning groups or approved by ERCOT TAC. The following is the preliminary estimate of the transmission required to connect the new plant into the grid at either of these two sites. It should be noted that the 138-kV and 345-kV systems are independent solutions. That is, only one is required to interconnect the plant into the ERCOT grid. Combination 345-kV and 138-kV solutions are not discussed below as their costs were forecasted to be higher than either of the single voltage solutions.

138-kV Solution

1. Rebuild the following existing 69-kV lines with 138-kV construction and 959 ACSS conductor.
   a. Vicinity of Cottondale Switch to Reno (19 miles)
   b. Vicinity of Cottondale Switch to North Texas (26 miles)
   c. Vicinity of Cottondale Switch to Bowie (42 miles)
   d. Plant Site to vicinity of Cottondale Switch (existing Joplin to Cottondale Switch line, 5 miles)
2. Construct a new line from the plant site to the vicinity of the Oncor Bridgeport Substation (16 miles).
3. Construct two new lines in separate rights of way from the plant site to the vicinity of Cottondale Switch. (total of 10 miles).
4. Rebuild the lines serving the Joplin and Carter substations with 138-kV construction. (8 miles total).
5. Rebuild the Bowie to St. Jo 138-kV line with at least 795 MCM conductor (approximately 20 miles).

345-kV Solution

1. Rebuild the existing Jacksboro Switch to Parker 345-kV line with double circuit bundled 1590 MCM conductor (one circuit strung, 38 miles). In order to avoid the installation of a SPS (Special Protection System) this solution will require the construction of the Jacksboro Switch to West Denton 345-kV line (approximately 50 miles).

Bridgeport

The Bridgeport Site is located in Wise County and on the west side of the City of Bridgeport. Connection to the grid would be provided from the BEPC and ONCOR 138-kV transmission lines in the area. A plant output of approximately 1,000 MW would require the provision of 345-kV transmission with new ROW to the plant. The following is a preliminary estimate of the transmission required to interconnect the plant into the ERCOT transmission grid. It should be noted that the 138-kV and 345-kV systems are independent solutions.

138-kV Solution

1. Reconductor the following existing 138-kV lines with bundled 1033 conductor.
   a. BEPC/Rhome to Spring (49 miles)
   b. ONCOR/Decatur to Lonestar (15 miles)
2. Construct approximately 10 miles of new 138-kV line with bundled 1033 MCM conductor to route the lines in item 1 to the plant site.

345-kV Solution

1. Construct approximately 10 miles (2 single circuits in separate ROW of 345-kV line with bundled 1590 MCM conductor (rating of approximately 1630 Megavolt-Amperes (MVA). These lines will connect the planned Jacksboro Switch to West Denton 345-kV line to the plant.

Conclusions

Preliminary findings from the transmission studies performed indicate that the Jack County or Boonsville sites are preferred to the Bridgeport Site for the following reasons:

1. The addition of approximately 1000 MW at the Bridgeport Site would require the construction of approximately 20 miles of new 345-kV transmission in new ROWs. The Jack County and Boonsville Sites would only require that transmission required to loop the existing Parker to Jacksboro Switch line into the respective plant site.
2. A large percentage of the 138-kV transmission required for the Jack County or Boonsville sites has been determined to be required for the Jack County or Boonsville Sites has been determined to be required for other system reasons prior to the addition of any plant.

The majority of the line reconstruction and voltage conversion required for these two sites was projected to require reconstruction prior to the addition of any plant. Of the two voltage solutions proposed for the Jack County or Boonsville sites the preliminary findings indicate that the 138-kV solution is preferred for the following reasons:

1. The amount of transmission on existing ROWs
2. The lead time and cost required for 345-kV transmission
3. The reduction in the required amount of 345/138-kV autotransformer capacity
4. The majority of the line reconstruction would be required to meet future load growth in the area.

3.2.5.3 Water and Wastewater

BEPC has contracted with the Tarrant Regional Water District (TRWD) to supply 3.8 million gallons of water per day (MGD) to support the generation plant water usage requirements. The proposed raw water intake structure will be built on the southeast shoreline of Lake Bridgeport. The water will be transported using motor-driven booster pumps that will be located on the shoreline and connected to an 18- to 20-inch pipeline carrying a minimum of 1.9 MGD of water and a maximum of 3.8 MGD of water from Lake Bridgeport to the plant. The water pipeline parallels the gas pipeline within the same easement, south of U.S. Highway 380 (US 380). Once the water reaches the plant it will be discharged into an 8-million-gallon lined water storage pond located on the plant site. When this report was written it was the intent of BEPC to purchase 1.3 MGD from the City of Bridgeport. In April a meeting was held with BEPC conceptual design engineer and the City of Bridgeport engineers. It was determined that only .5–.6 MGD

of effluent water could be purchased from the City of Bridgeport wastewater treatment plant, without the return flow of waste water from the plant, and that the Zero Liquid Discharge system would recycle .78 MGD. BEPC decided not to return wastewater to the City of Bridgeport water treatment facility. Using .52 MGD from the City of Bridgeport and .78 MGD from the Zero Liquid Discharge system would give Brazos 1.3 MGD additional water to operate the unit in duct-firing for 5 hours during peak periods.

3.2.6 BEPC's Preferred Site Selection

The guidelines for identifying candidate sites for preliminary consideration in the Study included areas within 10 miles and 20 miles, respectively, of existing transmission lines (138 kV or higher) and natural gas pipelines. The sites identified by Burns & McDonnell in the Study were generally at the intersection of transmission lines and gas pipelines. Site scores are shown in Table 3-1.

Two potential site areas in southwestern Wise County and southeastern Jack County were identified by the Study – Boonsville and Vineyard. The preferred site in Jack County is located approximately 6 miles from the Boonsville site and is within 2 miles of the Vineyard site, satisfying the guidelines used for identifying candidate sites.

The Study identified that securing an adequate water supply would be an extremely important factor in selecting a site. Many of the sites had limited quantities of groundwater available. A limited quantity of surface-water was found to be available from the TRWD at Lake Bridgeport. Obtaining water from the Brazos River proved to be unfeasible because by state law, river authorities, water districts, and other entities having authority over the use of water are divided into specific regions or "basins." The Jack County, Vineyard, Boonsville and Bridgeport sites are in the TRWD basin and not the Brazos River Basin. Most of the water available from TRWD has previously been committed to two plant developers, Tractebel and Duke Energy. BEPC was able to secure adequate water supplies for a nominal 500-MW plant by purchasing the rights for development of the Jack County Site from Duke Energy. Purchasing the development rights for the Jack County Site also provided easements for water and gas pipelines, and an air permit. Construction of a gas pipeline from the site to the Bridgeport area provides an opportunity for fuel supply diversity by allowing access to a minimum of two fuel supply and transportation sources. An 16-inch gas pipeline that crosses the Jack County site provides access to a third fuel supply and transportation source.

The Study ranked the Boonsville Site higher than the Vineyard Site based on the criteria for fuel supply and water supply. Securing a water supply and comparable access to fuel supplies increases the ranking for the Jack County Site, and thus it was BEPC's preferred site (Figure 3-2).

Table 3-1
Generation Plant Site Selection

Overall Score	Site Location	Transmission Potential[1]	Plant Size Potential	Transmission Distribution Service Provider	Transmission Rating[2]	Operations & Maintenance[3]	Water[4]	Gas Providers	Gas Rating[5]
6	Boonesville	138 kV	500-1000 MW	BEPC	1	1	2	TXU/Devon/KM	2
9	Bridgeport	138 kV	500 MW	BEPC/Oncor	2	3	3	?/Devon/KM	1
6	Jack	138/345 kV	1000 MW	BEPC	1	2	1	Devon/KM/TXU	2

[1]Voltage options for connection to the grid

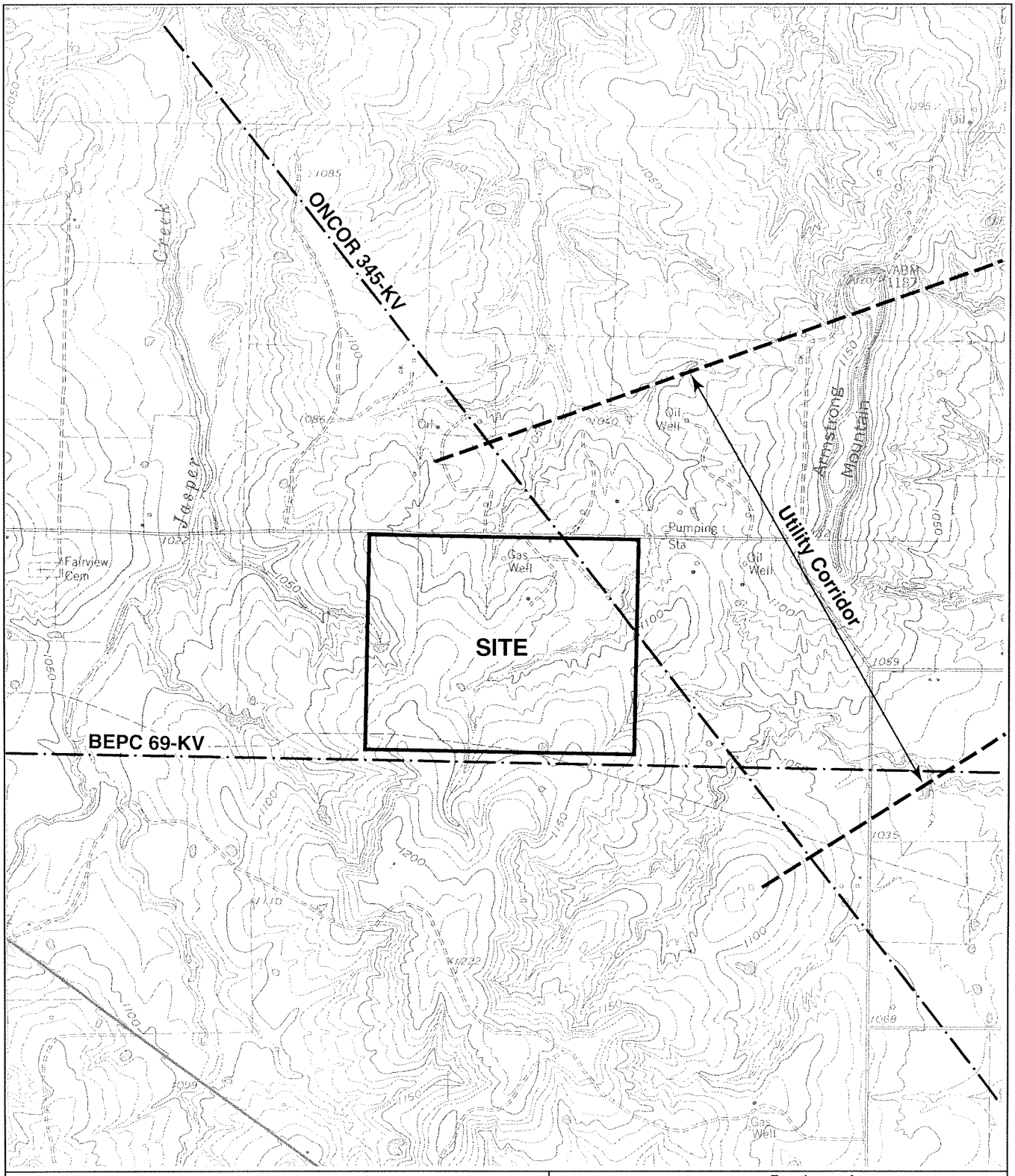
[2]Based on ERCOT studies and potential sources

[3]Based on utilization of existing employees

[4]Based on availability, quantify, and quality

[5]Based on quantity, distance, reliability

Note: Lowest Score is Best



PBS&J

- Engineering
- Environmental Consulting
- Surveying

Figure 3-2

PROPOSED JACK COUNTY POWER PLANT SITE

Base Map: USGS 7.5' Quadrangle; Gibtown

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4.0 Affected Environment

4.0 AFFECTED ENVIRONMENT

The following section describes the affected environment of the proposed Jack County Power Plant site and the utilities corridor associated with this site. Together, these two locations are hereafter referred to as the Project Area (Figure 4-1).

Although other electrical transmission line connections between the Jack County site and the regional transmission system will likely occur in the future, their exact location and alignment are not known at this time. However, any additional transmission lines will have to be approved by the PUCT and/or RUS, and will undergo an environmental review at that time.

4.1 CLIMATOLOGY AND AIR QUALITY

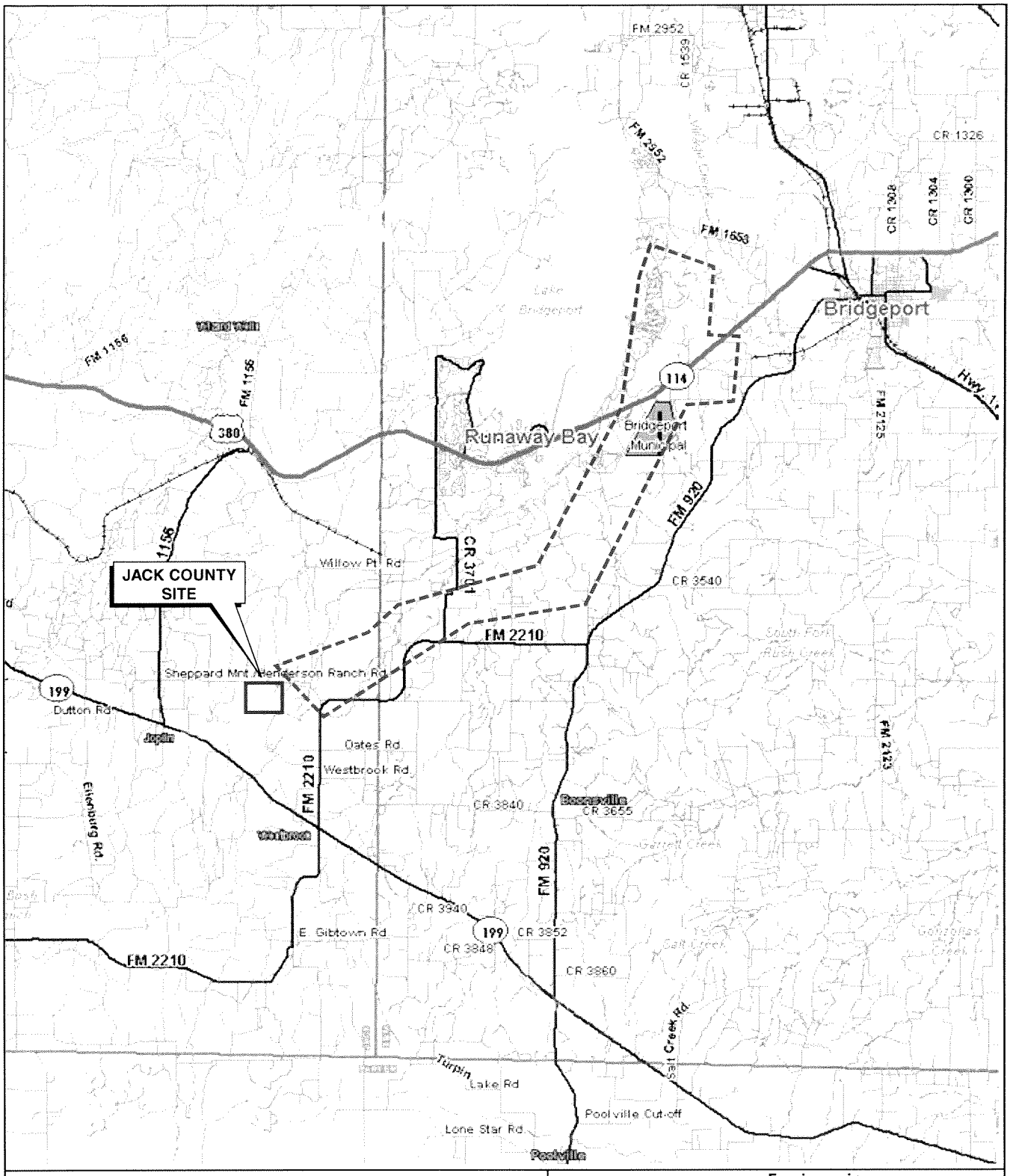
4.1.1 Climatology

The project area is located in Jack and Wise counties, west of the Dallas/Fort Worth Metroplex in north central Texas, approximately 250 miles north of the Gulf of Mexico. Winters are mild, but "blue northers" occur about three times each year, and often are accompanied by sudden drops in temperature. Periods of extreme cold that occasionally occur are short-lived, so that even in January mild weather occurs frequently (National Weather Service (NWS), 2003). Except where otherwise noted, the data presented here were collected from the Climatic Atlas of Texas (Texas Department of Water Resources (TDWR), December 1983).

The annual average minimum and maximum temperatures are 52 degrees Fahrenheit (°F) and 77°F, respectively. Historically, January is the coldest month, with an average minimum temperature of 31°F, while August is the hottest month with average maximum temperatures of 97°F.

Throughout the year, rainfall occurs more frequently during the night. Usually, periods of rainy weather last for only a day or two, and are followed by several days with fair skies. A large part of the annual precipitation results from thunderstorm activity, with occasional heavy rainfall over brief periods of time. Thunderstorms occur throughout the year, but are most frequent in the spring (NWS, 2003). The average annual precipitation falls between 28 and 32 inches. Monthly rainfall averages range from approximately 1.50 inches in December to 3.50 inches in May.

Based on seasonal surface wind data, the windiest season is spring with an average wind speed of 13 miles per hour (mph). The average annual wind speed for Dallas-Fort Worth is 10.25 mph (Bomar, 1983). The most frequent annual wind direction is south (based on a 16-point compass), occurring mostly during the summer and spring. Data for annual frequency distribution of wind direction was presented on a "wind rose" (TDWR, 1983), where the wind radials for each direction represent the percentage of time during the year when the wind flows from that direction.



north

1 0 1 2 miles

Source: Jack & Wise Co.

PBSJ

• Engineering
• Environmental Consulting
• Surveying

Figure 4-1

PROJECT AREA LOCATION
(POWER PLANT SITE
AND UTILITIES CORRIDOR)

JACK CO. POWER PLANT PROJECT

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The primary meteorological factors which characterize the dispersion of air pollutants in the project area are surface wind (previously discussed), atmospheric stability, mixing layer height, transport wind, and the frequency of stagnating anticyclones.

Atmospheric stability is determined by the vertical motion of the lower atmosphere, resulting from thermal and mechanical turbulence, which act to disperse air pollutants. Unstable conditions (when vertical mixing is enhanced) or neutral, windy conditions are most likely to produce maximum short-term ground level air pollutant concentrations due to elevated buoyant emissions sources. Persistent wind directions and neutral to stable atmospheric conditions can be expected to cause 24-hour pollution concentration maxima and regions of higher annual average concentrations. Stable conditions (when vertical mixing is suppressed) can result in greater impacts for continuous ground-level releases of non-buoyant emissions.

Mixing layer heights and mean transport wind speeds determine the volume through which pollutants can eventually be mixed. Low mixing heights can mean high concentrations of pollutants through trapping of pollutant plumes or decreased dilution of area source emissions. In general, the greater the mean mixing height and transport wind speed, the less the impact of air pollutant emissions. Holzworth (1972; 1974) analyzed annual and seasonal values of mixing height and transport winds for a period of five years (1960 through 1964) for 62 stations in the U.S. The upper air station closest to the project area is Midland, which consistently ranked high in the absence of extended periods with poor dispersion. Maximum concentrations of air pollutants often occur at ground level during periods of anticyclone (high pressure system) stagnation.

4.1.1 Air Quality

National Ambient Air Quality Standards (NAAQS)

The U.S. Congress has established the framework for air quality regulations through passage of the Clean Air Act. The Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to establish national ambient air quality standards for air contaminants for which emissions, in the judgment of the EPA, cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. The presence of emissions in the ambient air results from numerous or diverse mobile or stationary sources. National primary ambient air quality standards define levels of air quality which the EPA judges are necessary, with an adequate margin of safety, to protect the public health. National secondary ambient air quality standards define levels of air quality which the EPA judges necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Thus far, the EPA has established primary and secondary ambient air quality standards for the following pollutants: particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, and lead (Pb). Allowable limits for various pollutants may be accessed by referring to *National Ambient Air Quality Standards* as per 40 CFR 50.

Prevention of Significant Deterioration (PSD) of Ambient Air Quality

For areas which have attained the National Ambient Air Quality Standards, the Clean Air Act provides for a new source review program to ensure that no significant deterioration of the existing air quality will result from the construction of new emission sources and from the modification of existing emission sources. Pursuant to the Clean Air Act, the EPA has promulgated PSD regulations which provide for a preconstruction review by the state air quality agency of "major" emission sources of air pollutants which are regulated under the Clean Air Act. For 28 designated sources of air contaminants, a "major" stationary source is defined as a stationary source which has the potential to emit 100 tons per year or more of any of the pollutants regulated under the Clean Air Act, including any fugitive emissions (non-stationary source). Other stationary sources of pollutants are defined as "major" if the proposed emissions of any pollutant regulated by the Clean Air Act are 250 tons per year or more, excluding fugitive emissions.

New Source Performance Standards (NSPS)

The Clean Air Act requires the EPA to publish a list of categories of stationary sources which in its judgment causes or contributes significantly to air pollution which may reasonably be anticipated to endanger health or welfare. The EPA is then required to establish standards of performance for new sources within each category which reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction. The EPA must determine whether the emission reduction technology has been adequately demonstrated, taking into consideration the costs of achieving the emission reductions, any non-air quality health and environmental impact, and energy requirements. Thus far, the EPA has promulgated performance standards for 75 sources of air pollutants.

National Emission Standards for Hazardous Air Pollutants (NESHAPs)

Prior to the 1990 Clean Air Act Amendments (CAAA), the Clean Air Act required the EPA to publish a list of hazardous air pollutants (HAPs) which are defined as those pollutants for which no ambient air quality standard is applicable and which in the judgment of the EPA cause or contribute to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness. The EPA was then required to establish standards for those HAPs which in its judgment provides an ample margin of safety to protect the public health. The initial NESHAPs were promulgated under 40 CFR 61 for specific types of processes and operations from the following substances: Radon-222, beryllium, mercury, vinyl chloride, radionuclides, benzene, asbestos, and inorganic arsenic emissions. However, none of these promulgated NESHAPs are applicable to electric generating stations. Radon-222 is further described in Section 5.8, Public Health.

As part of the 1990 CAAA, the list of HAPs was statutorily increased to 189 contaminants, and a list of additional emission source categories, for which new emission standards were to be written, was

promulgated by the EPA. The new standards are being proposed and promulgated by the EPA under 40 CFR 63 and are known as Maximum Achievable Control Technology (MACT) standards. However, none of the MACT standards proposed or promulgated to date apply to electric generating stations.

State Implementation Plan (SIP) for PM_{10}, SO_2, VOC, NO_x, and CO

Within nine months after the promulgation of a national primary or secondary ambient air quality standard for a pollutant, the Clean Air Act requires each state to submit a plan which provides for implementation, maintenance, and enforcement of the primary or secondary standard in each air quality control region within the state. Development of the state implementation plan consists of a lengthy rulemaking process, including public notice, in which the state adopts regulations intended to meet minimally acceptable federal criteria in the manner most consistent with the state's air quality goals. Once an SIP is approved by the EPA, the primary authority for enforcement of the SIP is delegated to the state. If a state fails to submit an adequate SIP, the Clean Air Act requires the EPA to prepare and promulgate an implementation plan setting forth any necessary regulations.

The PM_{10} SIP for Texas consists of the state regulations contained in TNRCC (now known as TCEQ (Texas Commission on Environmental Quality, September 1, 2002)). Regulation I, Control of Air Pollution From Visible Emissions and Particulate Matter, 31 Texas Administrative Code Chapter 111. The primary Regulation I rule which would apply to the proposed project is Rule 111.155 which establishes net ground level concentration limits for particulate matter of 200 micrograms per cubic meter ($\mu g/m^3$) averaged over any three consecutive hours and 400 $\mu g/m^3$ averaged over any 1-hour period. This rule applies to concentrations of total suspended particulate (TSP) and not just to PM_{10}.

The SO_2 SIP for Texas consists of the state regulations contained in TNRCC (TCEQ) Regulation II, Control of Air Pollution from Sulfur Compounds, 31 Texas Administrative Code Chapter 112. The primary Regulation II rule which would apply to the proposed project is Rule 112.3 which establishes a net ground level concentration limit for SO_2 of 0.4 ppmv averaged over any 30-minute period.

Existing Air Quality

Air quality data are available from a TNRCC (TCEQ) monitoring station located in Weatherford, Texas, approximately 30 miles southeast of the project area. For more information, refer to http://www.tnrcc.state.tx.us/cgi-bin/monops/site_info.

The dispersed nature of emissions in the area and the large distances to major industrial areas ensure generally good air quality for the project area. According to the most recent update of the 40 CFR 81, the EPA has designated the project area as either "attainment" or "unclassified" for all six criteria pollutants. The area around the project area is Class II for Prevention of Significant Deterioration (PSD) purposes. No PSD Class I areas are within 100 kilometers of the project area.

4.2 GEOLOGY AND SOILS

The topography within the power plant site is gently rolling with elevations ranging from approximately 1,070–1,150 feet (ft) above mean sea level (msl). The topography within the utilities corridor is gently rolling to strong slopes with elevations ranging from approximately 770–1,200 ft above msl.

4.2.1 Geology

The power plant site overlies Cretaceous Age deposits of the Twin Mountains Formation. This formation is composed of sand, clay, and conglomerate. The sand found within the Twin Mountains Formation is brownish-yellow in color, and locally weathers to red. The clay found within this formation is red, gray, and green in color and ranges from thin-bedded to massive. The conglomerate is composed of chert, quartz, and quartzite clasts. The thickness of the Twin Mountains Formation is 175 to 200 ft (Bureau of Economic Geology (BEG), 1967).

The utilities corridor overlies several geologic formations including the Twin Mountains Formation, Jasper Creek Formation, Willow Point Formation, and Alluvium deposits (BEG, 1967). The Jasper Creek Formation is primarily composed of a variety of shale, limestone, and sandstone. The Jasper Creek Formation ranges in thickness from 310 to 330 ft (BEG, 1967). The Willow Point Formation is composed of shale, claystone, limestone, sandstone, and coal. The thickness of the Willow Point Formation is 150 to 200 ft (BEG, 1967). Alluvium deposits found within the utilities corridor are primarily the result of floodplain and channel deposits that consist of sand, clay, silt, and gravel. The approximate thickness of the alluvium deposits is 30 ft (BEG, 1967).

4.2.2 Soils

The General Soil Maps for Jack and Wise counties (Soil Conservation Service (SCS) now the Natural Resources Conservation Service (NRCS), 1973 and 1989), were used to identify and characterize the soils that encompass the project area. The SCS has mapped the soil associations that occur within Jack and Wise counties and consequently in the project area. A soil association is where taxonomic soil units occur together in individual and characteristic patterns within the same geographical area.

The power plant site is situated on soils of the Duffau-Windthorst Association. This soil association is described as gently sloping to sloping on deep, loamy and sandy upland soils. Soils of the Duffau series consist of deep, loamy, and sandy soils on uplands. These soils formed in loamy sediment or weakly cemented sandstone. Windthorst soils consist of deep, loamy soils on erosional uplands that formed in stratified clayey and loamy material (SCS, 1973 and 1989).

The utilities corridor is situated on soils of the Duffau-Windthorst Association (previously described), the Duffau-Keeter-Weatherford Association, the Windthorst-Chaney-Selden Association, the Truce-Cona Association, the Palopinto-Hensley-Lindy Association, and the Pulexas-Balsora-Deleon Association.

The Duffau-Keeter-Weatherford Association consists of deep, loamy and sandy, well drained soils underlain by weakly cemented sandstone or stratified loamy material on uplands. Keeter series soils consist of deep, loamy soils on uplands that formed in stratified packsand or sandstone that has loamy and shaly material with slope ranges of 1 to 6%. Weatherford series soils also consist of deep, loamy soils on uplands. Weatherford soils formed in weakly cemented sandstone and have slope ranges of 3 to 8%.

The Windthorst-Chaney-Selden Association of uplands is a moderately well drained, loamy and sandy soil underlain by loamy and clayey material. These soils are found on erosional uplands that have distinct drainage patterns with slopes of one to 6%. This association is used for either pasture or rangeland. A few areas that have slopes of less than 3% are still farmed to row crops (SCS, 1989). Chaney soils are found on upland stream divides, saddles, and side slopes and have a loamy fine sand surface layers to approximately 12 inches thick that is brown. From 12 to 46 inches the soil consists of three sublevels, the upper part is yellowish brown sandy clay with reddish yellow and grayish brown mottles. The middle part is brownish yellow sandy clay with red, yellowish red, and light gray mottles, and the lower part is brownish yellow sandy clay loam with red and light gray mottles. Selden soils are found on gently sloping slightly concave areas and are lower in elevation than the Windthorst and Chaney soils. These soils have a brown loamy fine sand surface layer about 13 inches. From 13 to 70 inches is brownish yellow sandy clay loam. Other soils included in this unit, but limited to isolated areas are Anocon, Cisco, Cona, Duffau, Hassee, Nimrod, and Pulexas (SCS, 1989).

The Truce-Cona Association is composed of soils found on gently sloping to strongly sloping ridges, hillsides, and valleys. Soils within this association are used mainly as rangeland. The soils in this association are mostly too stony and droughty for use as pasture or cropland (SCS, 1989). Truce soils typically have a dark brown fine sandy loam surface layer approximately 7 inches thick. From 7 to 51 inches, Truce soils consist of a yellowish red upper soil, dark yellowish brown middle part, and light yellowish brown lower part. The underlying soil to 80 inches is light gray very shaly clay. Cona soils are brownish and contain a very stony sandy loam surface layer about 9 inches thick. From 9 to 39 inches, Cona clay soils consist of a red upper soil, reddish yellow middle part, and brownish yellow lower part. The underlying soil to 60 inches is brownish yellow and reddish brown shaly clay that has light gray mottles (SCS, 1989).

The Palopinto-Hensley-Lindy Association is an upland association composed of very shallow to moderately deep, loamy, well drained soils underlain by limestone. The slope for this association ranges from 1 to 8%. Palopinto soils make up about 28% of the unit, Hensley soils make up about 22% of the unit, and Lindy soils make up about 12% of the unit. Several other soils make up the remaining 38% of this unit. Together, this soil association covers approximately 3% of the entire county (SCS, 1989). Palopinto soils are shallow, gently sloping to sloping soils of stony uplands. They consist of a brown silty clay loam surface layer to a depth of 15 inches, below which is coarsely fractured limestone. Hensley soils are found on gently sloping uplands. They are composed of dark brown very stony loam down to a depth of about 4 inches, underlain by red clay loam to a depth of 18 inches. The underlying material is

very hard, fractured limestone that has reddish clay and roots in the fractures. Lindy soils are found on gently sloping uplands. They are composed of reddish brown loam down to a depth of about 6 inches. The subsoil is reddish brown clay loam in upper part and clay in the lower part to a depth of 24 inches. The underlying material to 40 inches is hard limestone that is fractured in the upper few inches (SCS, 1989).

The Pulexas-Balsora-Deleon Association occurs on floodplains of the West Fork Trinity River, Big Sandy Creek, the upper part of Denton Creek, and some tributaries of these streams. Lake Bridgeport provides some protection from frequent flooding of the West Fork Trinity River. Pulexas soils make up approximately 55% of this unit, Balsora soils cover about 33%, Deleon soils cover about 9%, and 3% soils of minor extent (SCS, 1989). Pulexas soils are composed of a surface layer of light yellowish brown fine sandy loam to a depth of 7 inches, underlain by light yellowish brown to brown very fine sandy loam to a depth of 61 inches. A buried layer of brown loam extends to 72 inches. Balsora soils are yellowish brown silt loam to a depth of approximately 6 inches. The underlying material extends to a depth of 52 inches. The upper part is brown and yellowish brown silt loam, and the lower part is dark brown silty clay loam. A buried layer of grayish brown silty clay extends to 52 inches. Deleon soils are composed of a surface layer of dark grayish brown silty clay, underlain by an old buried surface layer of very dark grayish brown silty clay loam to a depth of 80 inches. These soils are mainly used for crops, pasture, hay, or pecan orchards were protected from frequently flooding (SCS, 1989).

4.2.3 Prime Farmland

Prime farmland is defined by the Secretary of Agriculture in 7 U.S.C. 4201(c)(1)(A) as land that has the best combination of physical and chemical characteristics for producing food, fiber, or seed and is also available for these uses (i.e., the land could be used as cropland, pastureland, rangeland, forestland, but not land that is developed or under water). It has the soil quality, growing season, and moisture supply needed to economically sustain high yields of crops when treated and managed properly (SCS, 1980).

A review of the U.S. Department of Agriculture's (USDA) Prime Farmlands of Texas list (USDA, 1992) shows that several of the soil associations within the project area contain soils that are considered prime farmland soils. These associations include Chaney, Duffau, Pulexas, Selden, Lindy, and Windthorst (USDA, 1992). However, according to unpublished NRCS soil maps and files, there are no prime farmland soils on the power plant site (Greenwade, 2003).

4.3 WATER RESOURCES

The project area lies entirely within the Trinity River Basin. This basin is bounded on the north by the Red River, on the east by the Sabine and Neches rivers, on the west by the Brazos and San Jacinto rivers, and on the south by the Neches-Trinity Coastal Basin. The Trinity has an overall length of approximately 550 river miles and drains an area of approximately 17,969 square miles (Texas Water Development Board (TWDB), 1997).

4.3.1 Surface Water Quality

The nearest reservoir is Lake Bridgeport, a large body of water, which overlaps portions of the project area. The conservation pool of Lake Bridgeport is 836.0 ft msl and covers a surface area of 13,000 acres (ac). It has a capacity of 386,420 ac-ft, and supplies an average of 79,000 ac-ft of water to surrounding communities. TRWD (formerly Tarrant County Water Control and Improvement District No.1), presently owns and operates Lake Bridgeport and is charged with providing raw water to the cities of Arlington, Mansfield, and Fort Worth, which then sell drinkable water to many of the other cities in Tarrant County. The district also provides water to entities in Wise County (TWDB, 1997).

Water quality samples from monitoring stations in Lake Bridgeport were collected by the TWDB in 1994. Water from several stations located from Bridgeport Dam in Wise County, to a point immediately upstream from the confluence of Bear Hollow in Jack County, and up to the normal pool elevation of 836 ft, was evaluated. The results indicated that effluent was of a limited amount and that contact recreation and the public's water supply was acceptable (Texas Commission on Environmental Quality (TCEQ), 1994) (formerly Texas Natural Resource Conservation Commission).

4.3.2 Floodplains

The Federal Emergency Management Agency (FEMA) has designated 204 cities within the Trinity River Basin as having one or more potential flood-prone areas within their respective boundaries. Identification and mapping of these areas continues at a rapid pace and as each critical area is mapped, the municipality in each of these areas normally becomes a participant in the National Flood Insurance Program. As more communities enter the program and future rating studies are completed, a comprehensive basin-wide standard will emerge (Texas Department of Water Resources (TDWR), 1984).

Flood Hazard Boundary Maps produced by the U.S. Department of Housing and Urban Development (HUD) and Flood Insurance Rate Maps produced by FEMA were obtained for Wise County. Since Jack County is currently not mapped, no FEMA maps were reviewed. However, no low-lying areas are believed to traverse the project area other than small intermittent drainages.

According to the floodplain maps for Wise County, several parts of the study area are crossed by 100-year floodplains, specifically in the areas adjacent to Lake Bridgeport (FEMA, 1990). Low-lying areas within and adjacent to the project area include portions of Willow Creek, Boons Creek, Coal Creek, several coves and inlets of Lake Bridgeport, and the West Fork of the Trinity River immediately east of the lake. All of these low-lying areas are designated as being within the 100 year floodplain (FEMA, 1990).

4.3.3 Ground Water

This section evaluates the ground water in North-Central Texas, particularly in Wise and Jack counties and within the project area. Ground water information has been obtained from published and non-published reports, field surveys, aquifer tests, and surrounding wells, and on-site well information.

4.3.3.1 Regional Characteristics

Underlying a broad region of Texas, the Trinity Aquifer extends from south-central Texas to the Red River in north Texas. It supplies water to all or part of 55 counties in Texas including Jack and Wise counties and the project area. It formed during the early Cretaceous period and is composed of a group of formations: (from youngest to oldest), the Paluxy, Glen Rose, and Twin Mountains. The outcrop or updip portion of the aquifer underlies the project area and is the place where the Glen Rose is thin or missing but where the Paluxy and Twin Mountains coalesce to form the Antlers Formation. The Antlers consists of up to 900 ft of sand and gravel, with clay beds in the middle portion (TWDB, 1995).

Water from the Antlers is primarily used for both municipal and irrigation needs in north-central Texas. Yields of large-capacity wells average about 430 gallons per minute (gpm), with some areas yielding more than 2,000 gpm (TDWR, 1984). During the 1970s, ground water withdrawals from the Trinity Group Aquifer caused water level declines of 19 to 32 ft per year within the Trinity River Basin. Reductions in artesian pressures that result from lowered water tables significantly increased the potential for saline-water encroachment in Denton, Tarrant, and Dallas counties (TDWR, 1984). In 1980, 7,360 MW of steam electric generating capacity in the Trinity River Basin was recorded for industrial use and a total of 1,100 acre-feet (ac-ft) of ground water withdrawn for such purposes. In addition, approximately 45,900 ac-ft of surface water was consumed and 320 ac-ft of treated municipal effluent used for cooling electric power plants (TDWR, 1984).

Other ground water uses in the past have included a total of 79,900 ac-ft of water withdrawn for irrigating 34,400 ac in the Trinity River Basin in 1980, although this amount was predominately used in the coastal rice belt. Estimated fresh water use for mining purposes in the Trinity River Basin totaled 17,300 ac-ft in 1980 with most of this concentrated in Wise, Dallas, and Liberty counties (TDWR, 1984).

Generally, ground water is acceptable for municipal uses, however, extensive development in the Dallas-Fort Worth region has caused water levels in the Trinity Aquifer to drop as much as 550 ft. For these reasons, municipalities of the region have begun to abandon public supply wells in favor of surface water supplies (TWDR, 1984).

4.3.3.2 Ground Water Recharge and Local Aquifer Conditions

The primary source of ground water in the Antlers Formation is precipitation along the outcrop. The average annual precipitation is approximately 32 inches and the mean temperature about 64°F. Surface

water seepage from lakes and streams on the outcrop is also a significant source of ground water. The rate of movement of water through the aquifer depends upon the permeability, porosity, and the hydraulic gradient, however, the average rate of movement of water in the Antlers is about 1 to 2 ft per year (TDWR, 1982).

4.3.3.3 Ground Water Movement and Water Quality

Ground water occurs primarily within sand and sandstone units of the Twin Mountains and Antler formations and exits under water table conditions along the outcrop and under artesian conditions where confining beds of limestone, shale, and clay overlie the water-bearing units. Movement of ground water is primarily down gradient, from high to low elevations, and at right angles to the contours that denote the configuration of the water table. Movement is also to the east and, locally, away from ground-water highs and towards the surface drainage system (TWDB, 1988).

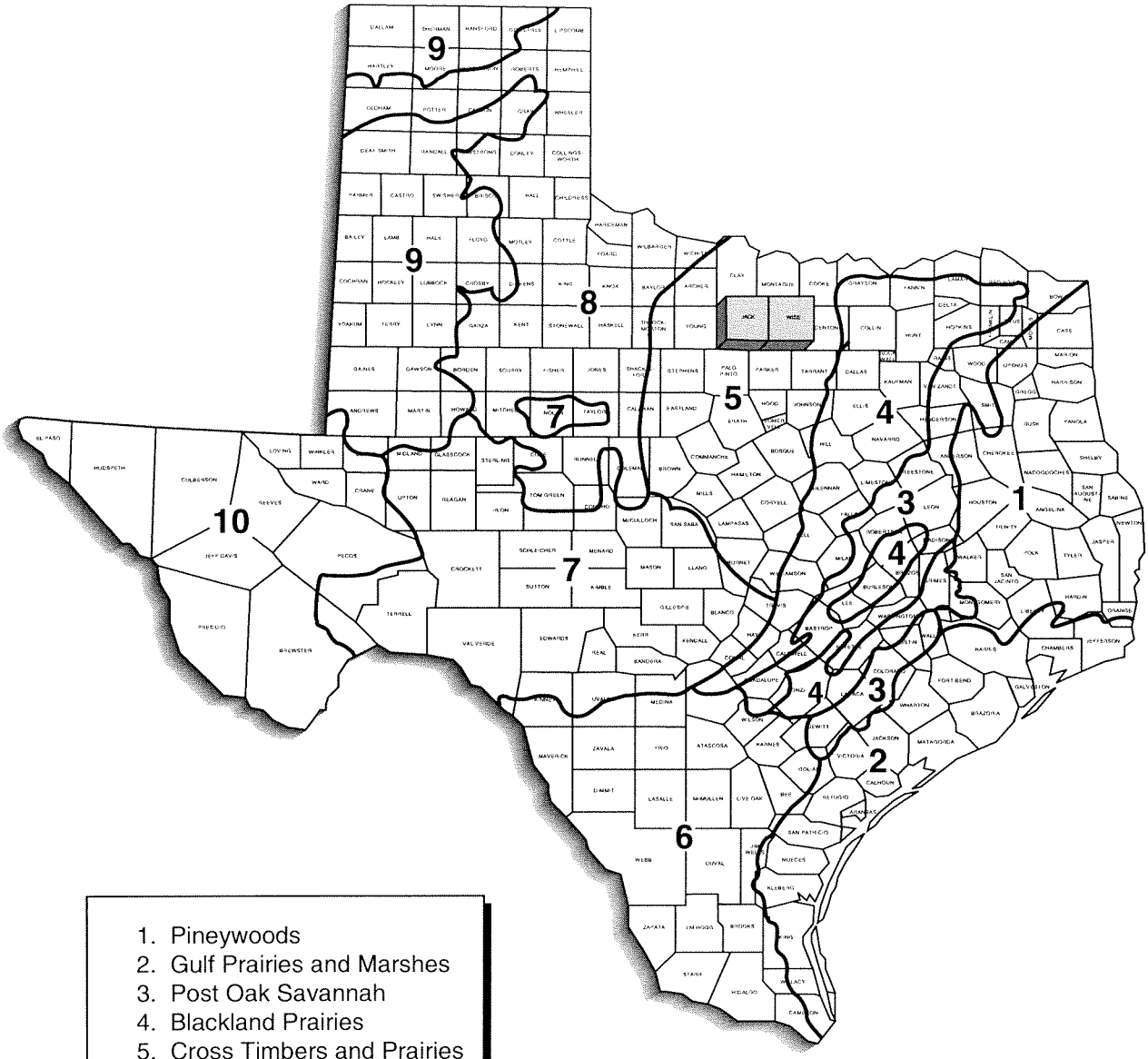
Eight sample wells (three in Jack County) completed in the Trinity Aquifer Group were collected as a part of a study conducted by TWDB and all tests were completed in the Twin Mountains Formation. Due to the lack of samples available in the project area, only general statements of water quality can be derived from the study. Results demonstrated that sulfate content averaged 142 milligrams per liter (mg/l) with 1 of the 8 samples exceeding 300 mg/l. Chloride content averaged 172 mg/l with 2 of the 8 samples greater than 300 mg/l. Fluoride and nitrate content was low. Hardness seemed to be the main problem with an average hardness of CaCO3 of 528 mg/l. Dissolved solids content averaged 883 mg/l. All samples would be classified as very hard (greater than 180 mg/l) (TWDB, 1988).

4.4 ECOLOGY

4.4.1 Vegetation

4.4.1.1 Regional Vegetation

As shown on Figure 4-2, the project area counties fall within the Cross Timbers and Prairies Vegetational Area of Texas as delineated by F.W. Gould (1975). The Cross Timbers and Prairies is bordered by the Blackland Prairies to the east and the Rolling Plains immediately to the west. Climax vegetation is mainly composed of big bluestem (*Andropogon gerardi*), little bluestem (*Schizachyrium scoparium*), yellow indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), Canada wildrye (*Elymus canadensis*), minor amounts of sideoats grama (*Bouteloua curtipendula* var. *caespitosa*), blue grama (*Bouteloua gracilis*), hairy grama (*Bouteloua hirsuta*), Texas wintergrass (*Stipa leucotricha*), and buffalograss (*Buchloe dactyloides*). Approximately 75% of this area is used as range and pasture, and the major crops in this vegetational area are peanuts, fruits, sorghum, wheat, oats, corn, and forages. The predominant livestock activities are beef cattle and cow-calf operations (Hatch et al., 1990).



north

100 0 100 200

scale in miles

Source: Hatch et al., 1990

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Figure 4-2

LOCATION OF JACK AND WISE COUNTIES IN RELATION TO THE VEGETATIONAL AREAS OF TEXAS

JACK COUNTY POWER PLANT

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4.4.1.2 Vegetation Community Types in the Project Area

The dominant vegetation community type identified within the project area is pastureland, as well as a small tract of woodlands limited to the riparian zone of a tributary to Jasper Creek.

The pastureland vegetation community is dominated by Bermuda grass (*Cynodon dactylon*) western ragweed (*Ambrosia psilostachya*), old-field threeawn (*Aristida oligantha*), some honey mesquite (*Prosopis glandulosa*), and various other native herbaceous vegetation. The woodland vegetation community is dominated by post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), hawthorn (*Crataegus* spp.), and green briar (*Smilax* spp.).

Vegetation community types occurring within the utilities corridor include upland woodland, bottomland/riparian hardwood forest, grassland (including pasture and cropland), cutover/regenerative areas, and hydric and aquatic habitats. Upland woodland communities are a relatively minor component within the utilities corridor due to the fact that much of the region has been converted to pastureland and rangeland and some cropland, with the remaining woodlands restricted to linear, riparian zones along streams.

The oak woodland community types that occur within the utilities corridor, as described by McMahan et al. (1984), are Post Oak Parks/Woods and Live Oak-Mesquite-Ashe Juniper Parks. Their characteristics range from woodland areas to park-like stands. The Post Oak Parks/Woods community type makes up the majority of the woodland areas found within the utilities corridor. These communities consist of post oak (*Quercus stellata*), live oak (*Quercus virginiana*), ashe juniper (*Juniperus ashei*), honey mesquite (*Prosopis glandulosa*), Texas oak (*Quercus texana*), shin oak (*Quercus sinuata* var. *breviloba*), cedar elm (*Ulmus crassifolia*), netleaf hackberry (*Celtis reticulata*), agarito (*Mahonia trifoliata*), Mexican persimmon (*Diospyros texana*), blackjack oak (*Quercus marilandica*), eastern red cedar (*Juniperus virginiana*), black hickory (*Carya texana*), sandjack oak (*Quercus incana*), and yaupon (*Ilex vomitoria*). The understory in this area consists of American beautyberry (*Callicarpa americana*), hawthorn (*Crataegus* spp.), Alabama supplejack (*Berchemia scandens*), trumpet-creeper (*Campsis radicans*), dewberry (*Rubus* spp.), coral-berry (*Symphoricarpos orbiculatus*), little bluestem (*Schizachyrium scoparium*), silver bluestem (*Bothriochloa saccharoides*), sand lovegrass (*Eragrostis trichodes*), Texas pricklypear (*Opuntia lindheimeri*), saw greenbriar (*Smilax bona-nox*), Texas wintergrass (*Stipa leucotricha*), Texas grama (*Bouteloua rigidiseta*), purple three-awn (*Aristida purpurea*), hairy tridens (*Tridens* sp.), and cedar sedge (*Carex planostachys*).

The grassland community type within the utilities corridor consists primarily of pasturelands (improved and unimproved), native grasslands (rangeland), oldfields, and ROWs. Managed pastureland is typically dominated by improved varieties of Bermuda grass (*Cynodon dactylon*) and bahiagrass (*Paspalum notatum*). Unimproved pastureland, oldfields, and ROWs consist of a variety of grasses, forbs and woody species. Common grasses found in these habitats throughout the project area include splitbeard bluestem

(*Andropogon ternarius*), lovegrasses (*Eragrostis* spp.), bristlegrasses (*Setaria* spp.), threeawns (*Aristida* spp.), brome grasses (*Bromus* spp.), and species of Panicum and Paspalum. Typical forb species include brown-eyed Susan (*Rudbeckia hirta*), partridge pea (*Cassia fasciculata*), croton (*Croton* spp.), rushes (*Juncus* spp.), goldenrods (*Solidago* spp.), asters (*Aster* spp.), thistle (*Cirsium* spp.), and American basketflower (*Centaurea americana*). Occasional woody species include common persimmon (*Diospyros virginiana*), sumacs (*Rhus* spp.), honey mesquite (*Prosopis glandulosa*), and southern dewberry (*Rubus trivialis*).

The cutover and regenerative communities in the project area occur primarily as a result of tree species having been allowed to regenerate in an area that was historically cleared for agricultural land or pastureland. In the absence of land management practices, however, woody species that were present prior to clearing have declined and certain invasive plant species now tend to populate these disturbed areas. The species composition of these areas varies somewhat depending upon factors such as topography, soils, hydrology, and the type of disturbance that the site has undergone, as well as the composition of surrounding vegetation.

4.4.1.3 Important Species

Important species are defined as those that (a) are commercially or recreationally valuable; (b) are endangered or threatened; (c) affect the well-being of some important species within criterion (a) or criterion (b); or (d) are critical to the structure and function of the ecological system, or are biological indicators.

No commercially important species were encountered within the power plant site. Commercially important species that may occur within the utilities corridor include hardwoods, hay crops, truck crops, and pastureland. Row crops that may be cultivated within the corridor, to a limited extent, include wheat, oats, cotton, peanuts, and sorghum.

4.4.1.4 Ecologically Sensitive Areas

In general, an area may be considered ecologically sensitive if: 1) it supports a rare plant or animal community or a rare, threatened, or endangered species; 2) it is valuable due to its maturity and the density and diversity of plants and animals it contains; or 3) it supports a community of plants adapted to flooding and/or saturated soil conditions and dominated by species considered to be wetland indicators by a regulatory agency (e.g., U.S. Army Corps of Engineers (USACE)).

The Texas Biological Conservation Data System (TXBCD) has no listed natural plant community series occurring in the vicinity of either the power plant or utilities corridor (TXBCD, 2002). These communities are ranked by the TXBCD according to conservation needs. TXBCD rankings are based on several factors including the number of relicts or locations remaining, the number of relicts or locations

protected, their estimated areal extent, and the relative threat of severe disturbance (Diamond et al., 1987). Other sensitive areas, such as regulatory wetlands, are discussed in Section 4.4.3.

4.4.2 Wildlife

4.4.2.1 Terrestrial Species

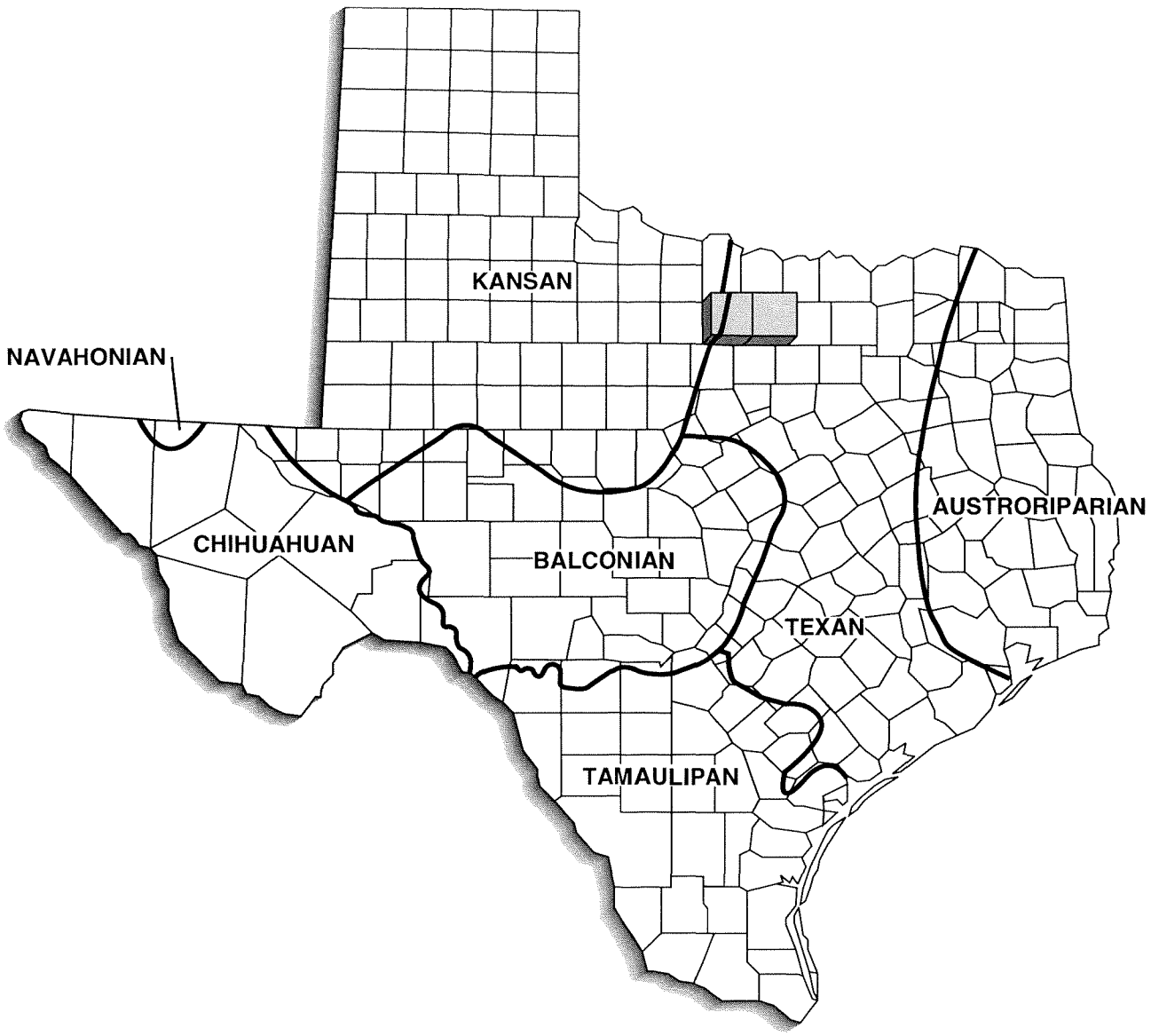
As shown on Figure 4-3, the project area counties lie primarily within the Texan Biotic Province with a small western portion of Jack County within the Kansan Biotic Province, as described by Blair (1950). As the project area only occurs within the Texan Biotic Province, the following text only addresses resources for this province. This province represents a transitional area between the forested Austroriparian Biotic Province to the east and grassland provinces to the west. Such integration of forests and grasslands results in a mixture of vertebrate species typical of the two general habitats. At least 49 species of mammals are known to have occurred in the Texan province in recent times, in addition to 39 snake species, 16 lizards, two land turtles, 18 anurans (frogs and toads), and five urodeles (salamanders and newts) (Blair, 1950). There are no endemic vertebrate species in this region.

According to Blair (1950), only five urodele species occur in the Texan Biotic Province, which is a barrier to the distribution of the endemic urodele fauna that occurs in the Balconian Biotic Province to the west and the fauna of the Austroriparian province to the east. The five urodele species found in the Texan Biotic Province also occur in the Austroriparian Biotic Province. There are no Urodele fauna that are known to occur within the project area (Dixon, 2000).

Anuran species expected to occur in the project area include Blanchard's cricket frog (*Acris crepitans blanchardi*), Strecker's chorus frog (*Pseudacris streckeri*), Woodhouse's toad (*Bufo woodhousii*), eastern green toad (*Bufo debilis debilis*), red-spotted toad (*Bufo punctatus*), Texas toad (*Bufo speciosus*), bullfrog (*Rana catesbeiana*), southern leopard frog (*Rana sphenocephala*), Hurter's spadefoot (*Scaphiopus hurterii*), Couch's spadefoot (*Scaphiopus couchi*), Cope's gray treefrog (*Hyla chrysoscelis*), and gray treefrog (*Hyla versicolor*) (Dixon, 2000; Bartlett and Bartlett, 1999).

Common reptiles expected to occur in the project area include turtles such as the red-eared slider (*Trachemys scripta elegans*), razor-backed musk turtle (*Sternotherus carinatus*), yellow mud turtle (*Kinosternon flavescens*), Texas river cooter (*Pseudemys texana*), and ornate box turtle (*Terrapene ornata*); and lizards such as the six-lined racerunner (*Cnemidophorus sexlineatus*), southern prairie lizard (*Sceloporus undulatus consobrinus*), Texas spotted whiptail (*Cnemidophorus gularis gularis*), eastern collard lizard (*Crotophytus collaris*), Texas spiny lizard (*Sceloporus olivaceus*), Texas horned lizard (*Phrynosoma cornutum*), great plains skink (*Eumeces obsoletus*), and little brown skink (*Scincella lateralis*) (Dixon, 2000; Bartlett and Bartlett, 1999).

Snakes of the project area include the eastern yellow-bellied racer (*Coluber constrictor flaviventris*), Texas ratsnake (*Elaphe obsoleta lindheimeri*), Baird's ratsnake (*Elaphe bairdi*), western coachwhip



north

100 0 100 200

scale in miles

Source: Blair, 1950

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Figure 4-3

LOCATION OF JACK AND WISE COUNTIES
IN RELATION TO THE
BIOTIC PROVINCES OF TEXAS

JACK COUNTY POWER PLANT

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(*Masticophis flagellum testaceus*), diamond-backed watersnake (*Nerodia rhombifer*), Blotched watersnake (*Nerodia erythrogater transversa*), bullsnake (*Pituophis catenifersayi*), prairie ring-necked snake (*Diadophis punctatus arnyi*), long-nosed snake (*Rhinocheilus lecontei*), groundsnake (*Sonora semiannulata*), Texas brownsnake (*Storeria dekayi texana*), checkered gartersnake (*Thamnophis marcianus*), western ribbonsnake (*Thamnophis proximus*), rough earthsnake (*Virginia striatula*); and several venomous species such as the broad-banded copperhead (*Agkistrodon contortrix laticinctus*), western cottonmouth (*Agkistrodon piscivorus leucostoma*), and western diamondback rattlesnake (*Crotalus atrox*) (Dixon, 2000; Tennant, 1998).

Numerous avian species are found within the project area. Common bird species include year-round residents such as the great blue heron (*Ardea herodias*), turkey vulture (*Cathartes aura*), black vulture (*Coragyps atratus*), red-tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), belted kingfisher (*Ceryle alcyon*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), black-crested titmouse (*Baeolophus atricristatus*), Carolina chickadee (*Poecile carolinensis*), northern mockingbird (*Mimus polyglottos*), northern cardinal (*Cardinalis cardinalis*), lark sparrow (*Chondestes grammacus*), red-winged blackbird (*Agelaius phoeniceus*), eastern meadowlark (*Sturnella magna*), great-tailed grackle (*Quiscalus mexicanus*), brown-headed cowbird (*Molothrus ater*), northern bobwhite (*Colinus virginianus*), and house sparrow (*Passer domesticus*).

Many other species of birds migrate through the study area in the spring and fall or use the area for nesting (summer) or overwintering. Migrant/winter residents expected to occur in the project area include the double-crested cormorant (*Phalacrocorax auritus*), Canada goose (*Branta canadensis*), northern pintail (*Anas acuta*), gadwall (*Anas strepera*), ring-necked duck (*Aythya collaris*), lesser scaup (*Aythya affinis*), hooded merganser (*Zophodytes cucullatus*), northern flicker (*Colaptes auratus*), ruby-crowned kinglet (*Regulus calendula*), cedar waxwing (*Bombycilla cedrorum*), yellow-rumped warbler (*Dendroica coronata*), chipping sparrow (*Spizella passerina*), field sparrow (*Spizella pusilla*), vesper sparrow (*Pooecetes gramineus*), savannah sparrow (*Passerculus sandwichensis*), white-throated sparrow (*Zonotrichia albicollis*), dark-eyed junco (*Junco hyemalis*), and American goldfinch (*Carduelis tristis*).

Summer residents expected to occur in the study area include the yellow-billed cuckoo (*Coccyzus americanus*), chuck-wills widow (*Caprimulgus carolinensis*), common nighthawk (*Chordeiles minor*), chimney swift (*Chaetura pelagica*), eastern kingbird (*Tyrannus tyrannus*), scissor-tailed flycatcher (*Tyrannus forficatus*), purple martin (*Progne subis*), barn swallow (*Hirundo rustica*), yellow-breasted chat (*Icteria virens*), summer tanager (*Piranga rubra*), blue grosbeak (*Passerina caerulea*), indigo bunting (*Passerina cyanea*), painted bunting (*Passerina ciris*), dickcissel (*Spiza americana*), and orchard oriole (*Icterus spurius*). Numerous other migrating species such as shorebirds wintering on the Gulf coast, passerines wintering in Central America, and raptors and waterfowl, pass through or over the project area during spring and fall migrations (Texas Ornithological Society (TOS), 1995; Griggs, 1997; Dickinson, 2002).

Mammals of potential occurrence in the project area include the Virginia opossum (*Didelphis virginia*), least shrew (*Cryptotis parva*), eastern mole (*Scalopus aquaticus*), eastern red bat (*Lasiurus borealis*), Brazilian free-tailed bat (*Tadarida brasiliensis*), nine-banded armadillo (*Dasypus novemcinctus*), eastern cottontail (*Sylvilagus floridanus*), black-tailed jackrabbit (*Lepus californicus*), black-tailed prairie dog (*Cynomys ludovicianus*), eastern fox squirrel (*Sciurus niger*), plains pocket gopher (*Geomys bursarius*), hispid pocket mouse (*Chaetodipus hispidus*), fulvous harvest mouse (*Reithrodontomys fulvescens*), Texas mouse (*Peromyscus attwateri*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), southern plains woodrat (*Neotoma micropus*), porcupine (*Erethizon dorsatum*), coyote (*Canis latrans*), common raccoon (*Procyon lotor*), common gray fox (*Urocyon cinereoargenteus*), American badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), bobcat (*Lynx rufus*), and white-tailed deer (*Odocoileus virginianus*) (Davis and Schmidly, 1994).

4.4.2.2 Aquatic Species

As mentioned previously, the project area lies in the Texan Biotic Province. Although the various biotic provinces were originally separated on the basis of terrestrial animal distributions, Hubbs (1957) has shown that the distribution of freshwater fishes within the state generally corresponds with the terrestrial-vertebrate province boundaries, although northeast Texas and the coastal zone show a number of departures from this general rule.

The aquatic habitats in the project area are dominated by Lake Bridgeport, small perennial streams, intermittent streams, and manmade impoundments. The principal tributaries to the West Fork of the Trinity River within and adjacent to the project area include Boons Creek, Willow Creek, Coal Bed Branch, Ramsey Creek, Hackberry Slough, and Jasper Creek. Vegetation in aquatic habitats is typically limited to the shallow edges of the water. Plant species common to this habitat type include rushes, sedges, cattails (*Typha* spp.), flatsedges (*Cyperus* spp.), spikesedges (*Eleocharis* spp.), and common buttonbush (*Cephalanthus occidentalis*). Additional species covering portions of the water's surface include yellow nelumbo (*Nelumbo lutea*), American waterlily (*Nymphaea odorata*), pondweed (*Potamogeton* spp.), and duckweed (*Lemna* spp.).

Associated with the streams and creeks are primarily bottomland/riparian forests and marshes. Impoundments generally result in either permanent or ephemeral freshwater flat wetlands, marshes, or fringe marshes. Low topographic areas generally result in those hydric habitats associated with impoundment, though most often on a smaller scale.

The majority of the hydric areas in the project area, which may also be considered potential jurisdictional wetlands (i.e., those wetland areas subject to USACE regulations), are primarily located within the floodplains that cross the project area. The West Fork of the Trinity River, Boons Creek, Willow Creek, Coal Bed Branch, Ramsey Creek, Hackberry Slough, and Jasper Creek, as well as their tributaries, all may include wetter portions of bottomland forests, along with occasional marshes. National Wetlands

Inventory (NWI) mapping (on 1:24,000 scale topographic base map) indicates a few wetland areas associated with ponds and floodplains within the project area (FWS, 1992). The wetter portions of bottomland forests that may be classified as hydric habitat undergo seasonal inundation and/or maintain saturated soils. Typical plant species in these bottomlands include water oak, willow oak (*Quercus phellos*), water hickory (*Carya aquatica*), pecan, and black willow.

Marshes are typically found as narrow bands along the edges of ponds and streams and support such species as cattails, rushes, sedges, flatsedges, smartweeds (*Polygonum* spp.), yellow-eyed grasses (*Xyris* spp.) and, occasionally, woody species such as common buttonbush and black willow.

The manmade ponds located in the project area exhibit variability in terms of their age, drainage, use by livestock, past stocking, and fertilization history. Unlike the creeks and streams of the area, these aquatic habitats are almost always exposed to full sunlight and do not experience the large fluctuations in water level and flow associated with streams during heavy precipitation. Bottom materials in these ponds are universally silt-sized to clay-sized particles, either naturally occurring where the pond was built or added as a liner to prevent its leaking.

In stream reaches dominated by scoured, sandy-clay bottoms, accumulations of woody debris or leaf pack provide the most important feeding and refuge areas for invertebrates and forage fish. While this material is also an important habitat component in reaches with soft, muddy substrate, the softer bottoms also generally harbor substantial populations of burrowing invertebrates (e.g., larval diptera and oligochaetes), which may be an important food resource to higher trophic levels.

The streams of the project area support aquatic species primarily adapted to ephemeral pool habitats. Because they consist of small headwater drainages in a predominantly sandy clay substrate, flow is unlikely to be sufficiently persistent to support any substantial lotic assemblage. Stream inhabitants will, instead, be species adapted to rapid dispersal and completion of life cycles in pool habitats having fine-grained substrates.

Fish are prominent in the trophic structure of most streams, being the largest and most conspicuous of the ecosystem's resident consumers. Extensive environmental changes in an area can lead directly or indirectly to changes in the feeding habits of fish. However, changes in available feeding levels are not necessarily detrimental, unless the organism's feeding habits are very specialized. Food habits of fish vary with season, food availability and life cycle stages. For example, the diet of most young fish consists of microscopic plants and animals including algae, protozoans and crustaceans found on plants, in bottom material or suspended in the water column. As fish develop and attain sexual maturity, feeding adaptations develop and the diets of some species become very restricted. Some fish are herbivorous, while others (e.g., bass) are strictly carnivorous. Most of the sunfish and catfish are omnivorous.

According to Lee et al. (1980) and Hubbs et al. (1991), up to 100 species of freshwater fish are known to occur in this region of Texas. Based on the size and characteristics of the various water bodies, however,

not all of these species would occur in the particular habitats available in the project area. Most of the creek segments in the area are too small or ephemeral to offer habitat to larger species, especially gamefish. The headwater segments of the feeder tributaries probably host minnows (*Notropis* spp.), mosquitofish (*Gambusia affinis*), topminnows (*Fundulus* spp.), and darters (*Etheostoma* spp.), with some younger members of larger species. With distance downstream, especially in pooled areas, the fish community tends to be heavily dominated by sunfish (*Lepomis* spp.) that are probably widely distributed in area streams when sufficient water is present. Impoundments within the project area support various gamefish such as the largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), channel catfish (*Ictalurus punctatus*), white crappie (*Pomoxis annularis*), and various species of sunfish (*Lepomis* spp.).

4.4.2.3 Recreationally and Commercially Important Species

Wildlife resources within the project area provide human benefits as a result of both consumptive and non-consumptive uses. Non-consumptive uses include activities such as observing and photographing wildlife, birdwatching, etc. These uses, although difficult to quantify, deserve consideration in the evaluation of the wildlife resources of the project area. Consumptive uses of wildlife species, such as hunting and trapping, are more easily quantifiable. Consumptive and non-consumptive uses of wildlife are often enjoyed simultaneously and are generally compatible. Many species occurring in the project area provide consumptive uses, and all provide the potential for non-consumptive benefits.

The white-tailed deer is the most important big game mammal in Texas. Deer require woodlands containing good shrub layers that provide food and cover. Edge situations are often favored for browsing. Although food habits vary regionally and seasonally, twigs of shrubs and trees, acorns, and various forbs and grasses make up most of a deer's diet (Martin et al., 1951). The TPWD divides the counties of Texas into several ecological areas for white-tailed deer management, with Jack and Wise counties falling within the Cross Timbers and Prairies Ecological Zone, as described in previous sections.

The 2000 TPWD estimate of the deer population for the Cross Timbers and Prairies Ecological Region was 394,134 deer, which is a 10.5% decrease from the 440,821 estimated in 1999. The buck to doe ratio in 2000 was 3.41 does per buck, a slight increase from 1999. The 2000 observed fawn crop was 0.42 fawn per doe. An estimated 7,552,512 ac of deer range occurs within this ecological region, which is 9% of the state's deer habitat (83,535,843 ac) and 11.1% of the state's deer population (3,543,763 deer) (TPWD, 2001).

Other game species regularly hunted within the Cross Timbers and Prairies region are the wild turkey (*Meleagris gallopavo*), northern bobwhite, mourning dove, rabbits, squirrels, American woodcock (*Scolopax minor*), and numerous species of migratory waterfowl (Sullivan, 1999; Roberson, 1999; Peterson, 1998a, 1998b; Perez, 1999).

Furbearers (e.g., common raccoon, Virginia opossum, bobcat, common gray fox, ringtail (*Bassariscus astatus*), and striped skunk) are of considerable economic and recreational importance in Texas. On a statewide basis, furbearers harvested during the 1997–1998 trapping season had a statewide value of almost $1.5 million. The raccoon harvest was the most at approximately $824,485, followed by the bobcat harvest ($131,670), and the nutria harvest ($90,668) (Del Monte, 1998). TPWD data show that the common raccoon was the most commonly observed furbearer in the Cross Timbers and Prairies ecoregion, followed by the skunk and common gray fox. Furbearers are generally most abundant in bottomland/riparian woodlands.

Lake Bridgeport and the West Fork of the Trinity River, which are located in the project area, are the only places for recreational fishing except for a few small-to-medium-sized impoundments or stock ponds that are located throughout the project area. Streams in the project area are generally too small to provide or support any substantial recreational or commercial fishery. The majority of sport fish in the creeks would either be so small, or found in such low numbers, that few people would fish them. Pond habitats in the area typically provide a private recreational fishery for landowners and their guests. No commercial fishery is known to occur in the project area.

Important gamefish and recreational species expected to occur in farm ponds and aquatic habitats include the largemouth bass, white crappie, black crappie (*Pomoxis nigromaculatus*), striped bass, white bass, channel catfish, green sunfish (*Lepomis cyanellus*), and bluegill (*Lepomis macrochirus*). Threadfin shad (*Dorosoma petenense*), brook silverside (*Labidesthes sicculus*), sunfishes, and gizzard shad (*Dorosoma cepedianum*) are important forage species. Important rough species include gar (*Lepisosteus* spp.) and several species of catfish (*Ictalurus* spp.).

4.4.2.4 Migratory Birds

In compliance with Executive Order (EO) 13186, potential impacts to migratory birds must be considered in the NEPA process. The Migratory Bird Treaty Act (MBTA) prohibits intentional and unintentional take of migratory birds, including their nests and eggs, except where permitted. Hundreds of species of birds migrate through the project area in the spring and fall or use the area for nesting (summer) or overwintering. Migrant/winter residents expected to occur in the project area include the double-crested cormorant (*Phalacrocorax auritus*), Canada goose (*Branta canadensis*), northern pintail (*Anas acuta*), gadwall (*Anas strepera*), ring-necked duck (*Aythya collaris*), lesser scaup (*Aythya affinis*), hooded merganser (*Lophodyles cucullatus*), northern flicker (*Colaptes auratus*), ruby-crowned kinglet (*Regulus calendula*), cedar waxwing (*Bombycilla cedrorum*), yellow-rumped warbler (*Dendroica coronata*), chipping sparrow (*Spizella passerina*), field sparrow (*Spizella pusilla*), vesper sparrow (*Pooecetes gramineus*), savannah sparrow (*Passerculus sandwichensis*), white-throated sparrow (*Zonotrichia albicollis*), dark-eyed junco (*Junco hyemalis*), and American goldfinch (*Carduelis tristis*).

Summer residents expected to occur in the project area include the yellow-billed cuckoo (*Coccyzus americanus*), chuck-will's-widow (*Caprimulgus carolinensis*), common nighthawk (*Chordeiles minor*), chimney swift (*Chaetura pelagica*), eastern kingbird (*Tyrannus tyrannus*), scissor-tailed flycatcher (*Tyrannus forficatus*), purple martin (*Progne subis*), barn swallow (*Hirundo rustica*), yellow-breasted chat (*Icteria virens*), summer tanager (*Piranga rubra*), blue grosbeak (*Passerina caerulea*), indigo bunting (*Passerina cyanea*), painted bunting (*Passerina ciris*), dickcissel (*Spiza americana*), and orchard oriole (*Icterus spurius*). Numerous other migrating species such as shorebirds wintering on the Gulf coast, passerines wintering in Central America, and raptors and waterfowl, pass through or over the project area during spring and fall migrations (Texas Ornithological Society (TOS), 1995; Griggs, 1997; Dickinson, 2002).

4.4.3 Wetlands

No jurisdictional wetlands were identified within the power plant site. However, one intermittent tributary of Jasper Creek (a jurisdictional water of the U.S.), with an average ordinary high water mark of approximately 5 ft, is located within the plant site.

Portions of the utilities corridor may cross bottomland/riparian forests and hydric and aquatic habitats that may be considered regulatory wetlands by the USACE. NWI mapping on 1:24,000 topographic maps prepared by the FWS indicates potential wetlands within the utilities corridor, including hydric categories such as open water, emergent wetlands, and broad-leaved deciduous forests as described by Cowardin et al. (1979). These wetland areas are predominantly associated with the riparian corridors and major tributaries of the West Fork of the Trinity River, Boons Creek, Willow Creek, Coal Bed Branch, and Hackberry Slough. If these areas meet the criteria necessary to be defined as jurisdictional wetlands, pursuant to Section 404 of the Clean Water Act (CWA), certain activities (e.g., placement of fill) are subject to regulation by the USACE.

Because the USACE has indicated they will not permit power plant activities separate from associated utilities construction, a project wetland report has not yet been prepared. Upon identification of pipeline alignments and subsequent delineation of new additional project impacts (to jurisdictional waters, if any), a project wetland report will be prepared and submitted for permitting efforts.

4.4.4 Endangered and Threatened Plant Species

4.4.4.1 Vegetation

Information was received from the TXBCD concerning the occurrence and location of state and federally listed plant species in the project area (TXBCD, 2002). The official state list of endangered and threatened plant species promulgated by the TPWD includes the same species listed by the FWS as endangered or threatened. Currently, 28 plant species are listed by the FWS as endangered or threatened in Texas (FWS, 1999a, b, and c). However, there are no known locations of threatened or endangered

plant species occurring in Jack or Wise counties nor, consequently, within the project area (FWS, 1999a, b, and c).

4.4.4.2 Wildlife

Table 4-1 lists those fish and wildlife species with a geographic range that includes Jack and Wise counties and that are considered by FWS or TPWD to be endangered, threatened, or rare. Sources reviewed to develop the list include FWS (1995 and 2001), TPWD (2003), and TXBCD (2002). It should be noted that inclusion on the list does not imply that a species is known to occur in the project area, but only acknowledges the potential for occurrence. Only those species listed as endangered or threatened by FWS are afforded federal protection.

Five taxa listed in Table 4-1 are considered by both the FWS and TPWD as endangered. These are the whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), Eskimo curlew (*Numenius borealis*), black-capped vireo (*Vireo atricapillus*), and red wolf (*Canis rufus*). One additional species, the bald eagle (*Haliaeetus leucocephalus*), is considered threatened by both the FWS and TPWD. The gray wolf (*Canis lupus*), recently downgraded from endangered to threatened by FWS, is still listed as endangered by TPWD.

It is the intent of the FWS to delist numerous species including the bald eagle, in the foreseeable future. Currently, of the species listed in Table 4-1, only the peregrine falcon has been officially delisted, while the bald eagle has been proposed for delisting.

The project area lies within the migration corridor of the whooping crane. Each fall, the entire whooping crane population from Wood Buffalo National Park in northern Canada migrates primarily to the Aransas National Wildlife Refuge (NWR) and adjacent areas of the central Texas coast in Aransas, Calhoun, and Refugio counties to overwinter (FWS, 1995). During migration, these birds may stop at small stock ponds or other water bodies occurring in pastureland and feed in cultivated fields containing crops such as sorghum or corn. The whooping crane is a potential migrant in the project area, having been recorded from Jack County (Oberholser, 1974; Pulich, 1988; FWS, 1999a). However, due to the fact that large portions of the project area is composed of pastureland and upland woodland and devoid of suitable roosting habitat, the likelihood of whooping crane occurrence within the project area is greatly minimized.

The interior least tern historically has nested on sandbars of the Colorado River, Red River, and Rio Grande within Texas. Small remnant breeding populations persist at isolated locations within the historic range. This species winters along the entirety of the Texas coast. It may occur as a migrant in the project area (FWS, 1995; TOS, 1995). Since the project area is not known to harbor any suitable least tern habitat, it is doubtful that any interior least terns would occur in the project area, other than during migration.

TABLE 4-1

ENDANGERED, THREATENED AND RARE WILDLIFE OF POTENTIAL OCCURRENCE IN JACK AND WISE COUNTIES[1]

Common Name[2]	Scientific Name[2]	Status[3] FWS	Status[3] TPWD
BIRDS			
Whooping crane	*Grus americana*	E w/CH	E
Interior least tern	*Sterna antillarum athalassos*	E	E
Bald eagle	*Haliaeetus leucocephalus*	T/PDL	T
Black-capped vireo	*Vireo atricapillus*	E	E
Eskimo curlew	Numenius borealis	E	E
Black tern	*Childonias niger*	SOC	NL
White-faced ibis	*Plegadis chihi*	SOC	T
American peregrine falcon	*Falco peregrinus anatum*	DL	E
Arctic peregrine falcon	*Falco peregrinus tundrius*	DL	T
Western burrowing owl	*Athene cunicularia hypugaea*	SOC	NL
MAMMALS			
Gray wolf (extirpated in Texas)	*Canis lupus*	E	E
Red Wolf (extirpated in Texas)	*Canis rufus*	E	E
Black-tailed prairie dog	*Cynomys ludovicianus*	C	NL
Plains spotted skunk	*Spilogale putorius interrupta*	SOC	NL
Texas kangaroo rat	*Dipodomys elator*	NL	T
VASCULAR PLANTS			
Comanche peak prairie-clover	*Dalea reverchonii*	SOC	NL
REPTILES			
Texas horned lizard	*Phrynosoma cornutum*	SOC	T
Texas garter snake	*Thamnophis sirtalis annectans*	SOC	NL
Timber/Canebrake rattlesnake	*Crotalus horridus*	NL	T

[1] According to FWS (1999a, b, and c), FWS (2001), TPWD (2003), TXBCD (2002).

[2] Nomenclature follows Crother (2000), Hatch et al. (1990), Hubbs et al. (1991), AOU (1998, 2000, 2002), and Manning and Jones (1998).

[3]
- FWS - U.S. Fish and Wildlife Service.
- TPWD - Texas Parks and Wildlife.
- E - Endangered; in danger of extinction.
- T - Threatened; severely depleted or impacted by man.
- T/PDL - Currently listed as threatened, but proposed for delisting.
- E w/CH - Endangered; with critical habitat.
- PT - Proposed for threatened status.
- C - Candidate; sufficient information exists to support proposal for listing, but at the present, its status is precluded by other factors.
- SOC - Species of Concern; Species for which there is some information showing evidence of vulnerability, but not enough to support listing at this time.
- DL - Formerly listed as threatened or endangered, but due to significant population increases has officially been removed from threatened or endangered status.
- NL - Not listed.

The black-capped vireo is a spring and summer resident of the Balcones Escarpment and utilizes open, shrubby areas dominated by sumacs (*Rhus* spp.), shin oak (*Quercus sinuata* var. *breviloba*), Ashe juniper (*Juniperus ashei*), and live oak (*Quercus virginianus*) (Marshal et. al., 1985). It has been recorded from Jack County (FWS, 1999a). Its presence in the project area is possible if suitable habitat exists, however, this species is not expected, due to the general absence of appropriate habitat.

The Eskimo curlew is considered to be extinct or nearly so. The last few observations were on the Texas coast in the 1960s (Linam et al., 1994). It is extremely unlikely to occur in the project area.

The gray wolf and red wolf have been extirpated from Texas. The gray wolf formerly ranged over the western two-thirds of the state, but now is extirpated over all of the west (Davis and Schmidly, 1994; TOES, 1995; TXBCD, 2002). The last authenticated reports of gray wolves in Texas were in 1970 and the last red wolf specimens were taken in 1965 in Chambers County (Davis and Schmidly, 1994). The likelihood of these species occurring in the project area is extremely remote.

In Texas the bald eagle breeds along the Gulf coast and on major inland lakes. Additional numbers of migratory bald eagles winter in these habitats. No bald eagle nests are known to occur in the project area, however, bald eagles have been documented at nearby Lake Texoma, one county to the north (Ortego, 2001). The bald eagle has officially been proposed for delisting due to its significant population increases during the last several years (64 CFR 128; 36453–36464).

American peregrine falcons are rare migrants statewide and nest in the mountains of the Trans-Pecos ecological region of Texas. Arctic peregrine falcons migrate along the Texas coast during spring and fall and Padre Island is the most important known staging area for these migrants in the western hemisphere (Morizot and Maechtle, 1987). The FWS has officially delisted the American peregrine falcon (64 CFR 128; 36453–36464). This action also removes the Arctic peregrine falcon (*Falco peregrinus tundrius*) from the E/SA designation as well as any other free-flying peregrine falcons within the 48 conterminous states.

One species, the black-tailed prairie dog (*Cynomys ludovicianus*), is not yet proposed for federal listing, however, as a candidate species, its status is vulnerable enough for future consideration. Black-tailed prairie dogs formerly occupied many parts of the west, including the western half of Texas where they dwelt in great colonies called "towns," with thousands of individuals within one population. Their numbers have been reduced to a large extent by poisoning campaigns sponsored by the government, and soil and land disturbance due to agriculture (Davis and Schmidly, 1994).

While not listed by the TPWD, four taxa in Table 4-1 are considered federal species of concern (SOC). SOC are species where some evidence of vulnerability exists, but not enough to support listing at the present time. These SOC are the black tern (*Childonias niger*), the Western burrowing owl (*Athene cunicularia hypugaea*), the plains spotted skunk (*Spilogale putorius interrupta*), and Texas garter snake

(*Thamnophis sirtalis annectans*). Two other species are federal SOC and state-threatened: the white-faced ibis and Texas horned lizard.

The white-faced ibis, an inhabitant of marshes, is a rare to uncommon spring and fall migrant throughout Texas and Louisiana (TOS, 1995). It has been recorded in Wise County and is of potential occurrence in the project area (Oberholser, 1974; Pulich, 1988).

The Texas horned lizard was historically found throughout the state in areas of flat, open terrain with scattered vegetation and sandy and loamy soils. Over the past few decades, Texas horned lizard populations have declined significantly over the eastern portion of their range, possibly due to the widespread use of insecticides to control ants and other agricultural pests. (Bartlett and Bartlett, 1999). The Texas horned lizard is found throughout the state on upland bare grounds and in bunch-grass pastureland. It has also been recorded from Jack County (Dixon, 2000; FWS, 2000). Thus, the Texas horned lizard potentially could occur in the project area.

The Texas garter snake inhabits marshy, flooded pastureland or meadows and grassy or brushy cover near ponds and streams, including the riparian canyon habitat at the eastern edge of the Edward's Plateau (Tennant, 1998). It has been recorded from Wise County (Dixon, 2000) and is of likely occurrence in the project area.

The western burrowing owl is an inhabitant of open grasslands, including golf courses, road cuts, and airports, and is often seen in prairie dog towns (Oberholser, 1974). This species is an uncommon to common resident on the open prairies and grasslands in the western half of Texas east to Wilbarger County. It is a rare migrant and winter visitor east to the coast (TOS, 1995). It has been recorded from Wise County (Oberholser, 1974; Pulich, 1988), and thus could occur within the project area.

The black tern inhabits inland lakes, rivers, swamps, marshes, and wet meadows as well as coastal bays, estuaries and lagoons. It has been recorded from Wise County (Pulich, 1988) and thus may occur in the project area during migration.

The plains spotted skunk, a subspecies of the eastern spotted skunk, is limited to east Texas. It has been recorded from Jack County (Schmidly, 1983) and thus may occur in the project area. Spotted skunks are inhabitants of grasslands, forest edges, woodlands, croplands, fence-rows, and farmyards, but are not expected to widely occur in the project area.

The last two species afforded some protection are not listed by the FWS, however, TPWD has designated them as threatened species in the State of Texas. These two species are the Texas kangaroo rat (*Dipodomys elator*) and timber/canebrake rattlesnake (*Crotalus horridus*).

The timber rattlesnake usually prefers dense thickets, but can also be found in open, upland pine and deciduous woods and the second-growth pastures of fallow farmland (Tennant, 1998). This species has been recorded from Wise County (Dixon, 2000); therefore, this species may occur in the project area.

The Texas kangaroo rat is a rare rodent that lives on clay soils supporting sparse, short grasses and small, scattered mesquite bushes. It is also associated with fencerows adjacent to cultivated fields/roads. This species has been recorded from Jack County; therefore, this species may occur in the project area.

No federally listed endangered or threatened fish species are known to inhabit the streams or other aquatic habitats within the project area.

4.4.4.3 Designated Critical Habitat

The Endangered Species Act (ESA) calls for the conservation of "critical habitat," the areas of land, water, and air space that an endangered species needs for survival. These areas include sites with food and water, breeding areas, cover or shelter sites, and sufficient habitat to provide for normal population growth and behavior. One of the primary threats to endangered and threatened species is the destruction or modification of essential habitat areas by uncontrolled land and water development. No critical habitat for any endangered/threatened species is known to occur within the project area (TXBCD, 2002).

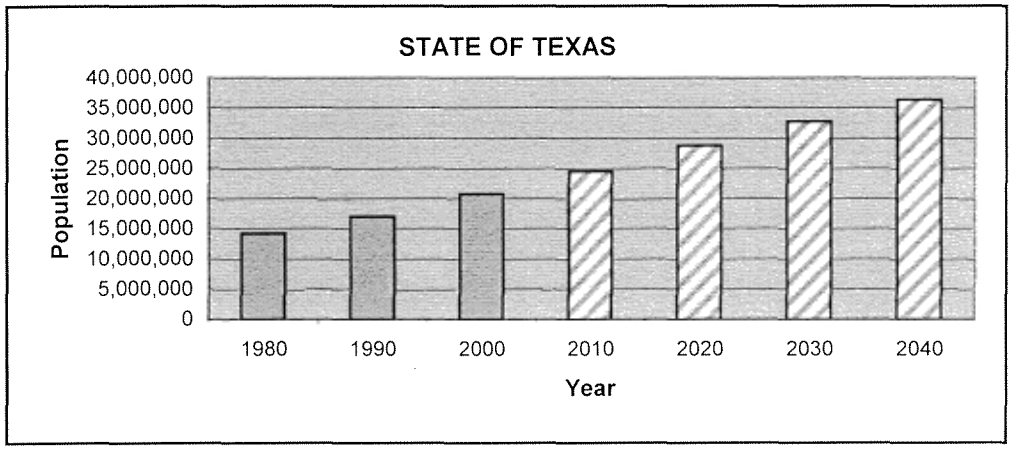
4.5 SOCIOECONOMICS

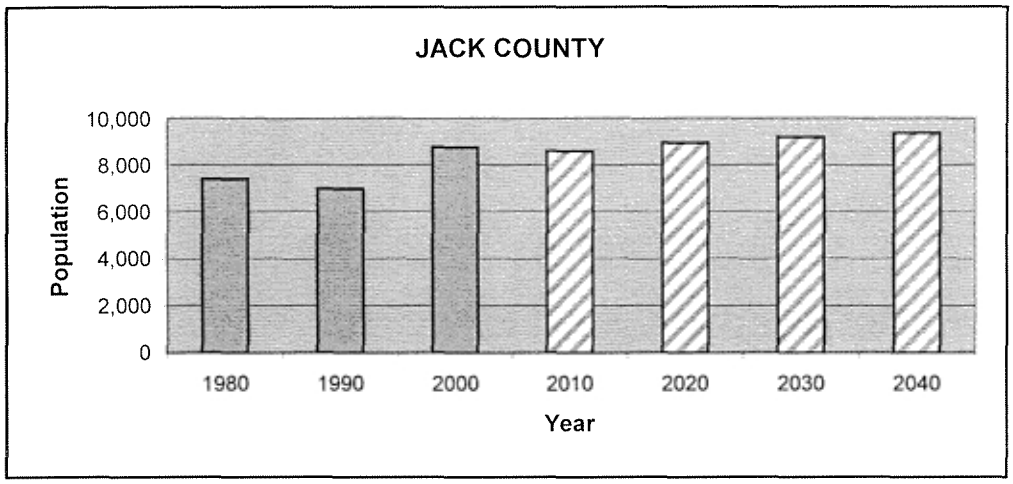
This section presents a summary of economic and demographic characteristics for Jack and Wise counties and describes the socioeconomic environment of the study area. Literature sources reviewed include publications of the Texas Workforce Commission (TWC), Texas State Data Center (TSDC), U.S. Bureau of the Census (USBOC), TWDB, and the Texas Comptroller of Public Accounts (TCPA).

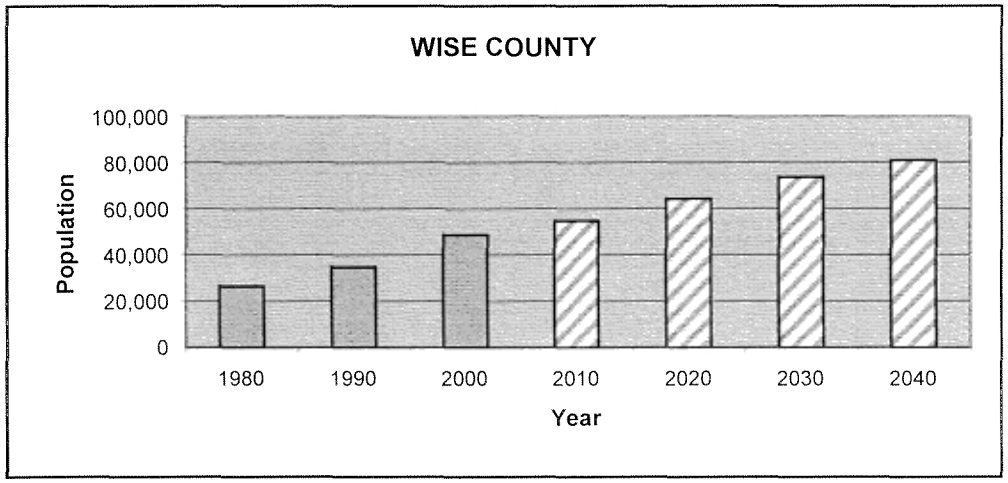
4.5.1 Population

Population growth within the study area has varied from steady growth in Wise County to very little change in Jack County. As shown in Figure 4-4, the population of Wise County grew 30% during the 1980s to reach nearly 35,000 in 1990, then increased an additional 40% during the 1990s to record just under 50,000 residents in 2000. This average annual increase of 4.2% between 1980 and 2000 is nearly double the population growth at the state level, which experienced an average annual increase of 2.3% during the same period. Located within close proximity to the Wise County portion of study area, the cities of Bridgeport, Lake Bridgeport, and Runaway Bay have also experienced a population increase during the 1990s. USBOC 2000 census figures recorded a population of 4,309 for the City of Bridgeport (a 20% increase from 1990), a population of 372 for the City of Lake Bridgeport (a 16% increase from 1990), and a population of 714 for the City of Runaway Bay (a 55% increase from 1990). By comparison, the population of Jack County has fluctuated over the last two decades, decreasing almost

FIGURE 4-4
POPULATION TRENDS AND PROJECTIONS







Source: USBOC, 1983, 1990, 2000; TWDB, 2002

6% during the 1990s (from 7,408 persons to 6,981 persons), then increasing more than 25% during the 1990s to reach 8,763 residents (USBOC, 1983; 2000).

Population forecasts provided by the TWDB indicate that Wise County is expected to experience continued steady growth over the next few decades. As shown in Figure 4-4, Wise County's population is projected to increase 66% by 2040 to reach approximately 81,000. This average annual increase of 1.7% is just slightly lower than the state's projected average annual increase of 1.9% during the same forty-year period. Population projections for Jack County indicate an average annual increase of just 0.2% between 2000 and 2040, to reach an estimated 9,353 persons (USBOC, 2000; TWDB, 2001).

4.5.2 Employment

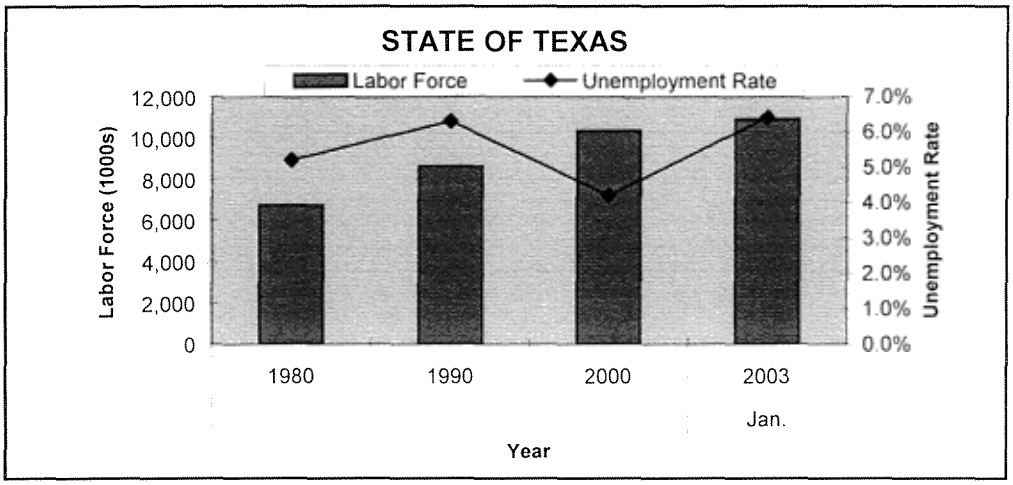
As shown in Figure 4-5, the civilian labor force (CLF) in Wise County grew from 11,462 to 15,886 during the 1980s (an average of 3.9% per year), and increased to 24,035 during the 1990s (an average of 5.1% per year). As of January 2003, the CLF had grown to approximately 28,399. A comparison of the 1997 and 2002 first-quarter employment records for Wise County shows that covered employment in 2002 grew by approximately 3,347 jobs over the 1997 levels, totaling 13,357 persons working within the county. This represents an increase of 33%, and is approximately triple the state increase of 11.5% during the same period. As shown in Figure 4-6, the three major employment sectors within Wise County include trade, transportation and utilities (24% of total employment), government (21%), and manufacturing (12%). Unemployment rates within Wise County have remained nearly two full percentage points lower than the state average since 1980. As shown in Figure 4-5, as of January 2003, the unemployment rate in Wise County was 4.5% (TWC, 2003).

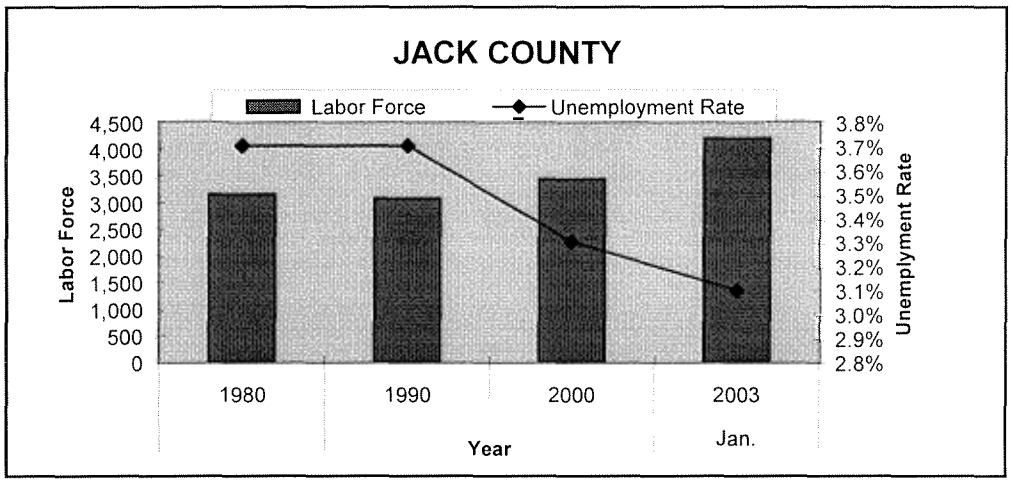
Jack County's CLF has fluctuated with the increases and decreases of its population since 1980. As shown in Figure 4-5, the county's CLF was recorded at 3,067 in 1990 (a 0.3% decrease from 1980), then climbed 1.2% during the 1990s to reach 3,423 in 2000. Recent TWC figures recorded Jack County's CLF at 4,188 in January 2003. Covered employment within Jack County rose 4.6% between the first-quarters of 1997 and 2002, adding a total of 83 jobs. As shown in Figure 4-6, Jack County's four-leading major employment sectors account for 75% of the county's total employment: government (27%), natural resources and mining (17%), nonclassifiable (16%), and trade, transportation and utilities (15%). Unemployment rates in Jack County have held rather steady since 1980. Figure 4-5 shows that the county's unemployment rate averaged 3.7% in 1980 and 1990, and has since decreased to 3.1% as of January 2003.

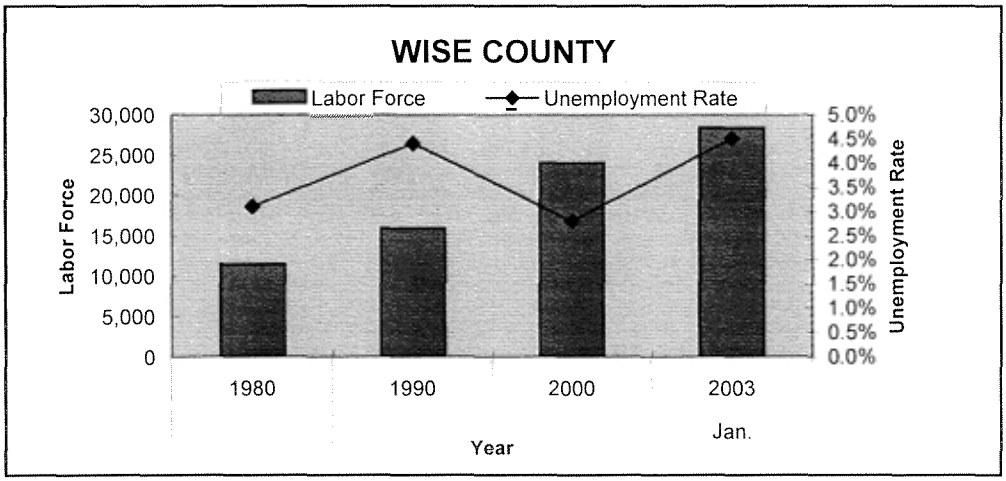
4.5.3 Environmental Justice

This section was prepared in compliance with Executive Order (EO) 12898, Federal Action to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations, which requires the determination of whether a proposed project would have disproportionately high and adverse human health or environmental effects on low-income populations and minority populations. The EO, signed on

FIGURE 4-5
CIVILIAN LABOR FORCE AND UNEMPLOYMENT RATE

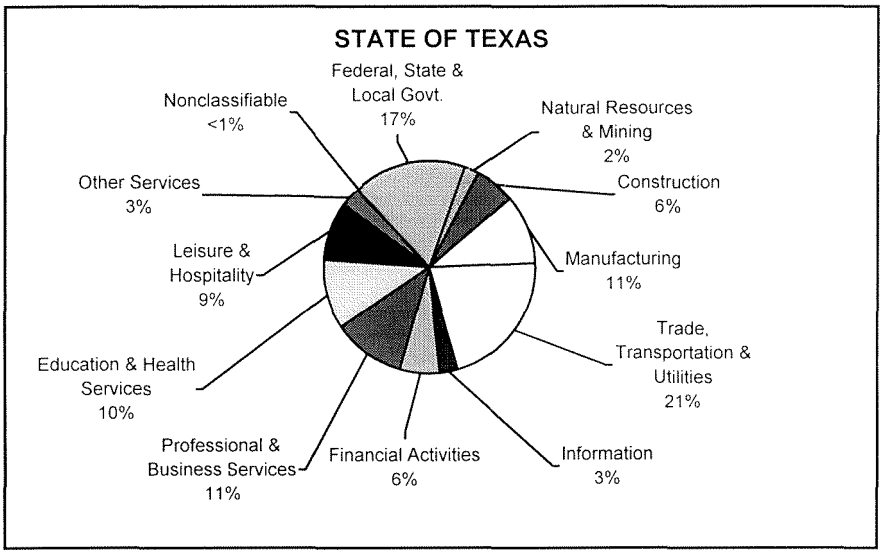


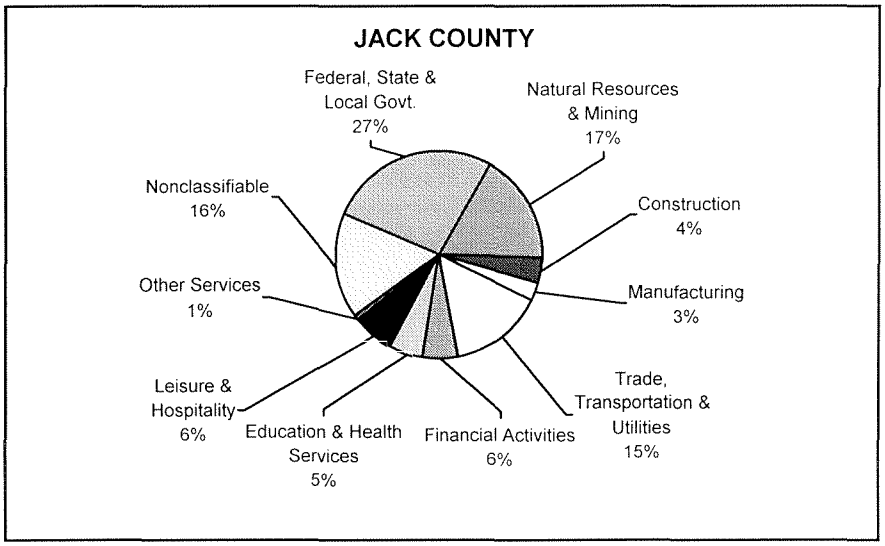


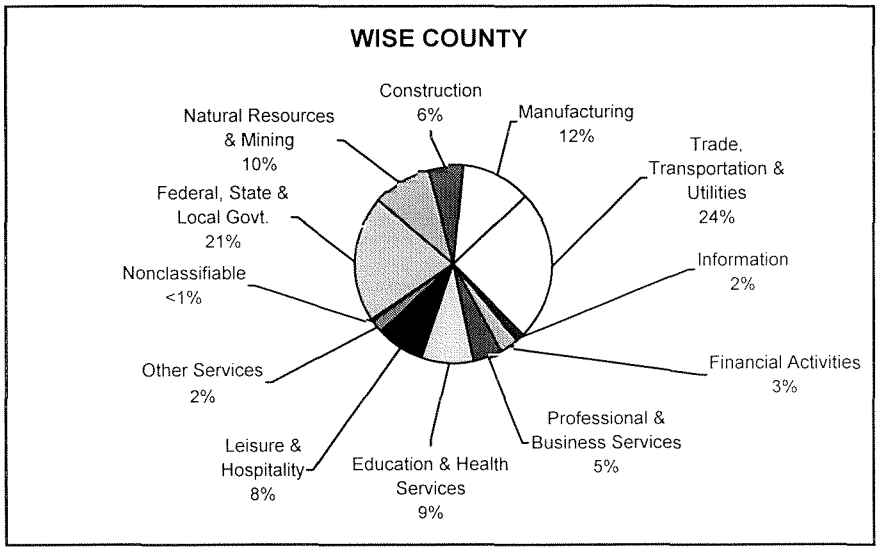


Source: USBOC, 1983; TWC, 2003

FIGURE 4-6
COVERED EMPLOYMENT AND MAJOR EMPLOYMENT SECTORS
FIRST QUARTER 2002







Source: TWC, 2002

February 11, 1994, requires all federal agencies to address the impact of their programs with respect to EJ. The EO requires that low-income and ethnic minority populations not receive disproportionately high adverse human health or environmental impacts and requires that representatives of any low-income or minority populations that could be affected by the proposed project be involved in the community participation and public involvement process.

4.5.4 Methodology

A 5-step methodology was patterned in part after the Environmental Justice Evaluation Approach published in the Transportation Research Board's Environmental Analysis in its Transportation newsletter (Shalkowski, J. 1999). The steps are discussed below.

Step 1: Step One is a test of disproportionate effects and U.S. Census analysis and is used to determine if populations living within the project area exhibit higher proportions of either ethnic minorities or persons of poverty status than populations living within the surrounding area. An analysis of the relevant census tracts were conducted to complete the disproportionate effects test.

Step 2: Step Two provides an evaluation of the findings of the disproportionate effects test. In this step, the findings of Step 1 are assessed and a determination is made to see if the EJ process has been completed or if further studies are necessary. If the potential for disproportionate effects to either ethnic minorities or persons of poverty status does not exist, then documentation of these findings completes the EJ process. However, if the potential for disproportionate effects to either of these demographic groups does exist, then Steps 3, 4, and 5 would be necessary to complete the process.

Step 3: Step Three involves the development of a public involvement and outreach program. The goal of the program is to provide a reasonable opportunity for proposed project stakeholders who represent minority and low-income groups that may be disproportionately affected to participate in and provide input to the proposed project development process.

Step 4: Step Four involves the evaluation of impacts (positive and negative) on all affected communities and/or stakeholders. This step involves documentation of interests, issues, concerns, and observations that relate to ethnic minority and low-income groups that are expressed in the public involvement and outreach program and in public comments on the draft EA.

Step 5: Step Five is the final step of the EJ process. It involves the development of EJ mitigation measures. According to the EO, the EJ disproportionate effects determination should take into account committed mitigation and enhancement measures and potential offsetting benefits to the affected minority and low-income populations. The EJ mitigation measures should reduce or offset adverse community impacts accrued by the proposed action. Mitigation measures are developed through public involvement with affected minority and low-income community leaders and citizen groups. This process involves public participation and is used to minimize adverse community impacts.

Below is the documentation of the 5-step process.

Step 1: Disproportionate Effects Test – Census Tract Analysis. The data used in this test to determine the potential for disproportionate impacts to low-income or ethnic minority populations within the project area are presented in Table 4-2. The information is based on the 2000 U.S. Bureau of the Census (USBOC) tract, city, county, and state level data for ethnicity and income. The project area is encompassed within three USBOC-designated census tracts. An average of the three census tracts, the study area, is given throughout this discussion.

In this analysis, the demographics of Jack and Wise counties provide a context within which the study area is comparatively analyzed. The study area would be considered to exhibit a disproportionately high percentage of ethnic minorities or low-income persons if the percentage of an ethnic minority or low-income population is at least 10% greater than the city's ethnic minority or low-income population. Data for the State of Texas are provided for comparison purposes.

Table 4-2 shows that the study area has a minority population of 8.5%, which is a lower rate than both of the counties and Texas. Not one of the individual census tracts has a higher population of ethnic minorities than either county or the state.

Table 4-2 also shows that in 1999, the study area had a lower percentage of persons living below the poverty line (8.8%) than both counties and the state. One tract (tract 9504 in Jack County) does have a higher percentage of people living below the poverty line (13.2%) than the county (11.3%). However, this tract does not exceed the 10% threshold and it is not considered to pose an EJ concern.

The median household income for the study area ($39,060) was slightly lower than the median household income of Wise County, but much higher than Jack County's. Each of the individual census tracts' median household income is close in range to their respective counties. For comparison purposes, the study area median household income was very near that of the State of Texas ($39,927).

Step 2: Evaluation of Findings of the Disproportionate Effects Test. The Census Tract analysis shows that the total study area does not exceed the 10% threshold for ethnic minorities. In fact, each of the individual census tracts has a lower ethnic minority population than their respective counties.

The percentage of persons living below the poverty level within the study area also does not present an EJ concern. Even though one tract (tract 9504, Jack County) has a slightly higher percentage of low-income persons than the percentage in the county, the difference does not exceed the 10% threshold.

Likewise, even though the median household income of the study area falls behind Wise County, it does not exceed the 10% threshold.

TABLE 4-2

ETHNIC MINORITY AND POVERTY DISTRIBUTIONS
IN CENSUS TRACTS 9504, 1504.02, AND 1504.02,
JACK AND WISE COUNTIES, AND THE STATE OF TEXAS

Place	Total	White		Minority		# Persons Below the Poverty Level in 1999		Median Household Income in 1999
		#	%	#	%			
Study Area Census Tracts								
9504, Jack County	1,451	1,350	93.0%	101	7.0%	191	13.2%	$31,875
1504.01, Wise County	5,767	5,112	88.6%	655	11.4%	461	8.0%	$40,000
1504.02, Wise County	4,502	4,259	94.6%	243	5.4%	377	8.4%	$45,304
Study Area Total/Avg.	*11,720*	*10,721*	*91.5%*	*999*	*8.5%*	*1,029*	*8.8%*	*$39,060*
Jack County	8,763	7,418	84.7%	1,345	15.3%	989	11.3%	$32,500
Wise County	48,793	42,109	86.3%	6,684	13.7%	4,689	9.6%	$41,933
Texas (in 1,000s)	20,851	10,927	52.4%	9,924	47.6%	3,117	14.9%	$39,927

Source: USBOC, 2000.

Therefore, this project is not believed to constitute a disproportionate impact under EO 12898, since there are no disproportionately high and adverse human health or environmental effects on low-income populations and minority populations living in the study area. Steps 3 through 5 are not necessary.

4.6 LAND USE/AESTHETICS

4.6.1 Land Use

Jack County is part of State Planning Region No. 3, which is represented by the Nortex Regional Planning Commission, headquartered in Wichita Falls. Wise County is a member of State Planning Region No. 4, which is represented by the North Central Texas Council of Governments, headquartered in Arlington. A review of the NRCS's (formerly the SCS) Natural Resource Inventory land use estimates show that urban land use accounts for just 1% and 3% of the total land in Jack and Wise counties respectively. Agricultural land uses cover approximately 97% of Jack County's total land area, with 91% devoted to range and pasture. By comparison, approximately 86% of the land in Wise County accounts for agricultural land use, with 76% dedicated to range and pasture (NRCS, 1992). Although much of the project area is in agricultural production or undeveloped and rural; urban, commercial and residential land uses do exist throughout the area, primarily within the limits of incorporated cities, in unincorporated towns and communities, and along major highways. Exploration and production activities of the oil and gas industry (pipeline easements, access roads, well pads, and remote processing plants) also comprise a significant land use within the study area. These land uses, however, generally do not interfere with ranching operations as land leased for underground minerals are also leased for surface grazing

The land where the proposed power plant site will be constructed is located near the eastern border of Jack County in a relatively undeveloped and rural area. A few isolated mobile homes and residences are located within one-half mile of the proposed power plant site. As the utilities corridor extends northeast, individual residences are scattered throughout the area, primarily along the network of county roads. Residential and commercial development increases within the northern portion of the utilities corridor, particularly along SH 114 and FM 1658. The incorporated City of Lake Bridgeport is located in the northern-most portion of the utilities corridor. Industrial land uses, including the Devon/Liquid Energy Bridgeport Processing Plant, also exist within and adjacent to the northern portion of the utilities corridor.

A review of the Texas Outdoor Recreation Inventory (TORI) (TPWD, 1995b), various scale federal and state maps, and a field reconnaissance of the project area revealed two recreational areas located within or adjacent to the site. Lake Bridgeport, is located to the north and west of the proposed utility corridor. This 13,000-ac impoundment on the West Fork of the Trinity River is owned and maintained by the TRWD. The lake provides numerous recreational opportunities such as water skiing, swimming, boating, fishing, and camping. Common sport fish in this lake include largemouth bass, catfish, crappie, smallmouth bass, sunfish, and whitemouth bass. TPWD maintains four public boat ramps along the lake, including one in the northern portion of the proposed utilities corridor, located on the southern side of the

dam along FM 1658. The privately owned Bay Landing Campground, owned by the Thousand Trails Corporation, is located on the southeastern shoreline of Lake Bridgeport, south of FM 1658. This facility offers 257 campsites in a resort style camp preserve for Thousand Trails members.

Additionally, many private land owners throughout the project area lease their lands for hunting during the appropriate seasons. The primary game species sought in this part of the state are white-tailed deer, quail, doves, and turkey.

A review of the Dallas-Fort Worth Sectional Aeronautical Chart (FAA, 2002a); the Airport/Facility Directory for the South Central U.S. (FAA, 2002b), and the TxDOT Texas Airport Directory (TxDOT, 2001), found that the Bridgeport Municipal Airport is the only public airfield located within the project area. A review of aerial photography, USGS maps, and field reconnaissance revealed no other public, private, or military airfield facilities within the project area.

4.6.2 Aesthetics

Potential aesthetic impacts is an area of increasing concern to both the public and governmental bodies dealing with siting and approving large, industrial facilities and utility corridors. Consideration of the visual environment includes a determination of aesthetic values (where the location of a power station or utility corridor could potentially affect the scenic enjoyment of the area). Aesthetic values considered in this analysis, which combine to give an area its aesthetic identity, include:

- topographical variation (hills, valleys, etc.)
- prominence of water in landscape
- vegetation variety (forests, pasture, etc.)
- color
- diversity of scenic elements
- degree of human development or alteration
- overall uniqueness of the scenic environment compared to the larger region

PBS&J's aesthetic analysis dealt primarily with potential visual impacts to the public. Viewsheds or scenic areas visible from roads, highways or publicly-owned or accessible lands (parks or privately owned recreation areas open to the public, for example) were analyzed. A number of factors are taken into consideration when attempting to define the sensitivity, or potential impact, to a scenic resource from the construction of the proposed power station and utilities corridor. Among these are the following:

- Uniqueness of the landscape in relation to region as whole
- Whether the scenic area is a foreground, middleground, or background view
- Focus of the view

- Scale of elements in the scene
- Number of potential viewers
- Duration of the view
- Amount of previous modification or disturbance to the landscape

Generally, the study area exhibits a moderate level of aesthetic quality for the region with scattered small communities surrounded by agricultural land and oil fields. Although the southwestern portion of the project area has maintained the feel of a rural Texas community with an agricultural economy, a good portion of this area is used for petroleum exploration/production and related oil field operations. As a result, the landscape within this portion of the project area exhibits a moderate level of impact from human development. The northern portion of the project area is more populated and has undergone more intense development and alteration of the natural landscape.

The region is characterized by gently rolling to hilly topography with elevations ranging from approximately 750 ft to 1100 ft above msl. Water features found within the project area include Lake Bridgeport and numerous tributaries of the West Fork of the Trinity River. The dominant vegetation communities represent a transition from oak-mesquite-juniper woodlands, to grassy pasture and croplands, to hydric and aquatic landscapes associated with the extensive matrix of Trinity River tributaries.

TxDOT has mapped 10 separate "Travel Trails" throughout Texas to provide travel routes through different areas of the state, highlighting natural, cultural and scenic attractions. These routes are described in pamphlets distributed by TxDOT offices and tourist information centers and marked by special signs along the designated highways. None of these travel trails, however, traverse the project area.

In 1998, TxDOT published a list of "Scenic Overlooks and Rest Areas" in Texas, each of which presented particularly strong aesthetic views or settings (TxDOT, 1998). A review of this list found none of the 46 locations described were located within the project area.

No other outstanding aesthetic resources, designated scenic views, scenic roadways, or unique visual elements were identified from the literature review or from field reconnaissance of the project area. In summary, although some portions of the project area are visually pleasing, little distinguishes its aesthetic quality from that other adjacent areas within the region.

4.7 NOISE

The State of Texas, and Jack and Wise counties do not enforce noise regulations limiting maximum noise levels from power station operations such as those levels that will occur within the project area. As directed by Congress in the Noise Control Act of 1972 and amended by the Quiet Communities Act of

1978, the EPA has developed noise level guidelines. The equivalent sound level (L_{eq}) is the A-weighted sound level that is "equivalent" to an actual time-varying sound level, in the sense that it has the same total energy for the duration of the sound. A decibel (dB) is a unit used to express the relative intensity of sounds on a logarithmic scale. The decibel unit of measure based upon an "A" weighted scale is listed as dBA. An outdoor Leq in excess of 55 dBA for 24 hours is considered annoying for some persons, while levels of 70 dBA or more for 24 hours can result in hearing loss (EPA, 1974). The day-night sound level (L_{dn}) is the 24-hour equivalent sound level with the nighttime (10:00 p.m. to 7:00 a.m.) sound level penalized by the addition of 10 dBA. EPA generally recognizes rural areas to have an average Ldn of less than 50 dBA (EPA, 1978). EPA has also developed guidelines for a short-term Ldn goal of 65 dBA and a long-term Ldn goal of 55 dBA for noise levels outside of structures such as buildings, residences, etc. (EPA, 1977). For residences, HUD considers an outdoor Ldn of 65 dBA or less to be "acceptable." An Ldn above 65 dBA and not exceeding 75 dBA is considered "normally unacceptable," and levels above 75 dBA are "unacceptable" (HUD, 1985).

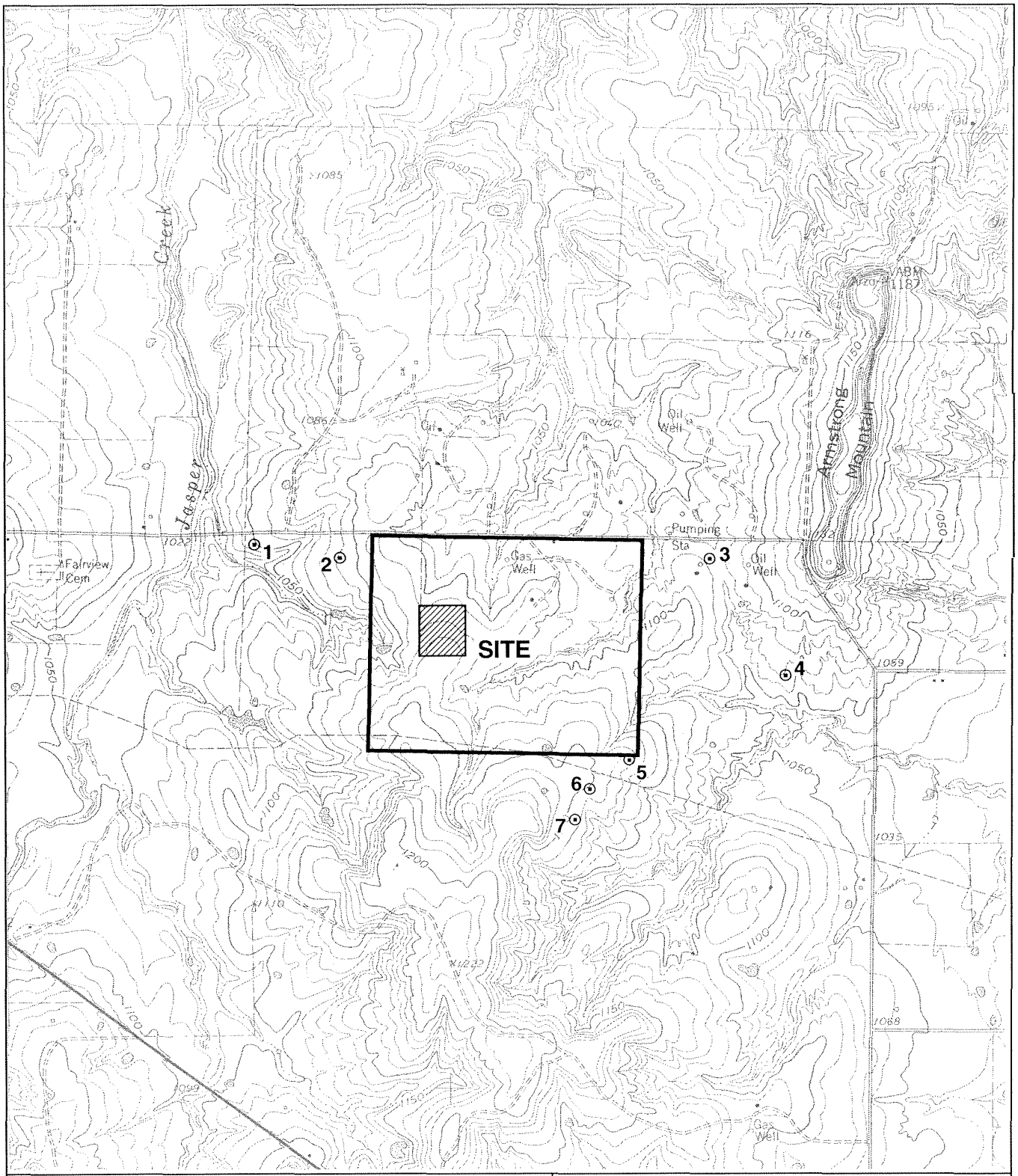
Land use adjacent to the proposed project site can best be described as a mix of rangeland with isolated rural residences, and a few scattered oil and gas operations. The major noise sources in the vicinity of the project site represent the daily activities of the general population, including motor vehicle noise associated with FM 2210 and various county roads. Seven noise-sensitive receiver locations within close proximity to the proposed project site, which include mobile homes and residences, are shown in Figure 4-7. Descriptions of the receivers and their approximate distances from the center of the proposed project site are listed in Table 4-3.

4.8 CULTURAL RESOURCES

As shown on Figure 4-8, the project area counties are located within the easternmost portion of the Plains Archeological Planning Region as defined by Kenmotsu and Perttula (1993). The cultural history of Jack County can be divided into four chronological periods: Paleoindian, Archaic, Late Prehistoric, and Historic. The three prehistoric periods have been defined based on environmental adaptation and specific diagnostic artifactual materials. The Historic Period reflects both the effects of European exploration on the indigenous populations of the area and the actual settlement of the region by Europeans and Euro-Americans. Historic sites reflect ranching, farming, and related activities, as these were the primary means of subsistence during much of the Historic Period in the region.

4.8.1 Cultural Setting

The Paleoindian Period (9,500 B.C. to 5,500 B.C.) is the earliest well-defined cultural period in the New World. It extends from the terminal Pleistocene until the early Holocene epochs. Social organization during the Paleoindian Period probably consisted of loosely structured, highly mobile social groups composed of several nuclear families. Sites of this period are often representative of transient camps



north

0 2000 4000 feet

Base Map: USGS 7.5' Quadrangle; Gibtown

PBS&J

• Engineering
• Environmental Consulting
• Surveying

Figure 4-7

NOISE SENSITIVE
RECEIVER LOCATIONS

JACK COUNTY POWER PLANT PROJECT

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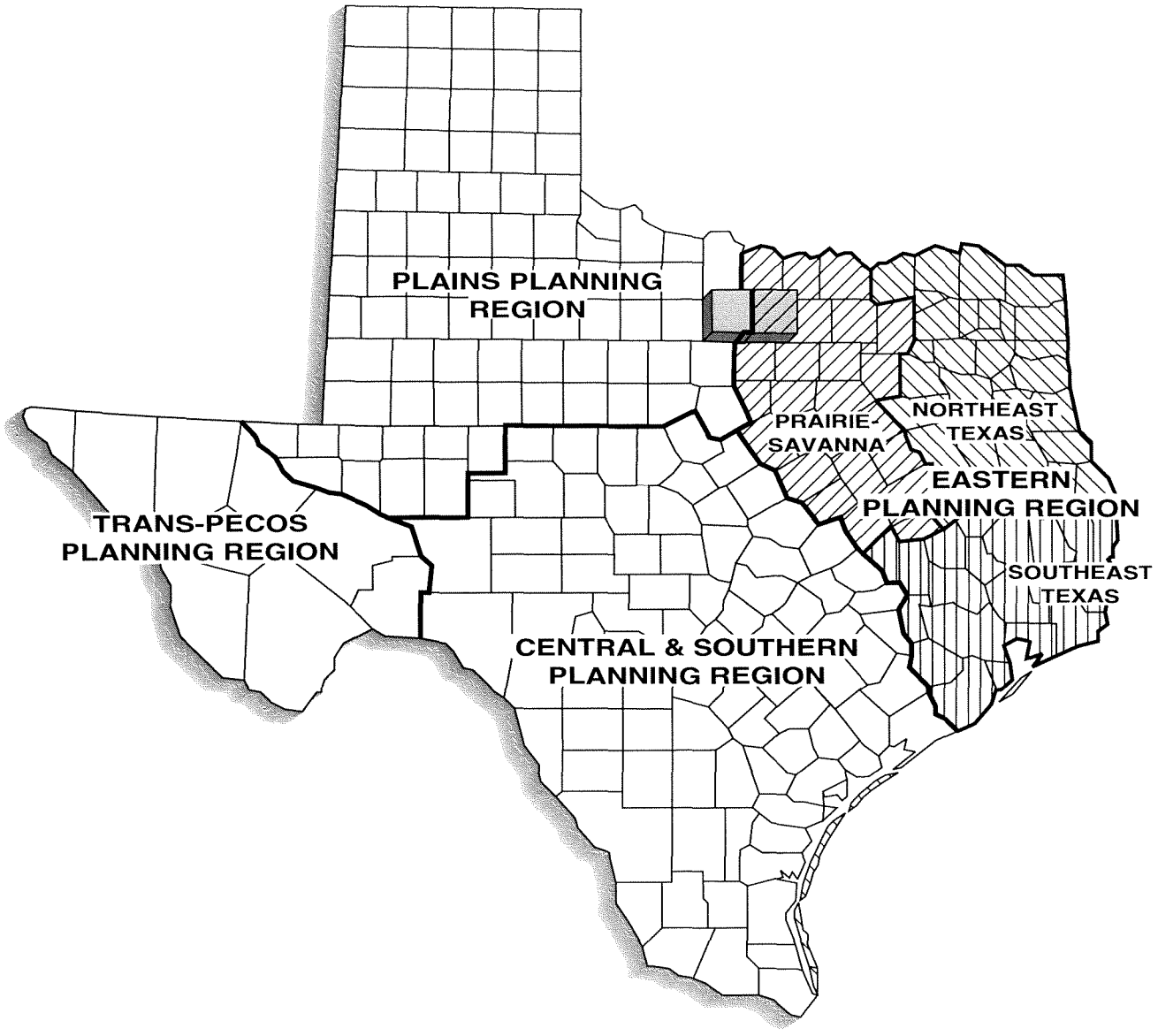
TABLE 4-3

DESCRIPTION OF NOISE SENSITIVE RECEIVERS

Site Number	Type of Structure	Distance From Center of Proposed Plant
1	Mobile Home	2,900
2	4 Mobile Homes	1,700
3	Mobile Home	3,900
4	Mobile Home	4,900
5	Mobile Home	3,200
6	Mobile Home	2,900
7	Single Family Residence	3,100



north

100 0 100 200

scale in miles

Source: Texas Historical Commission, 1996

PBS&J • Engineering • Environmental Consulting • Surveying

Figure 4-8

LOCATION OF JACK AND WISE COUNTIES IN RELATION TO THE CULTURAL RESOURCES PLANNING REGIONS OF TEXAS

JACK COUNTY POWER PLANT

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along small streams occupied by band-size or smaller groups. Base camp-sized occupations are relatively rare. The population density is thought to have been rather low during this period.

Diagnostic projectile points include *Clovis*, *Folsom*, *Angostura*, *Plainview*, and *Scottsbluff*. *Scottsbluff* is a transitional type which is also found in early Archaic sites in this area.

Differences in material culture during the Archaic Period (ca. 5,500 B.C. to A.D. 800) are believed to reflect somewhat larger and more localized populations, and changes in methods of food procurement and food processing. Although early Archaic populations made their living in much the same way as their Paleoindian ancestors, the Archaic Period as a whole can be characterized as having more specialized resource procurement activities as well as more specialized technology to accomplish these activities.

Archaic lithic scatters are one of the most common site types in the region. Early Archaic sites are generally characterized by surface scatters consisting of burnt rock, hammerstones, heavy utilitarian bifaces (choppers), gouges, and occasional dart points. Gouges, especially prevalent during the Early Archaic, declined in occurrence during the Middle and Late Archaic. By the Late Archaic, assemblages can be characterized by corner-notched dart points, ovate knives, thick-end scrapers, and ground stone artifacts.

Characteristic diagnostic artifacts include *Elam*, *Carrollton*, *Gary*, and *Yarbrough* projectile points. The Archaic in the region is represented by the Trinity Aspect, which is subdivided into the Elam and Carrollton foci (Crook and Harris, 1957).

The beginning of the Late Prehistoric Period (A.D. 500 to A.D. 1540) marks a significant change from earlier lifeways of the region. Most important is the introduction of two technological innovations, the bow-and-arrow and ceramics. In general, the aboriginal groups still functioned as nomadic hunters and gatherers living at the band level of social organization. However, tribal and confederacy groups formed, occasionally inhabiting semi-permanent or permanent village sites. In many parts of North America, the Late Prehistoric Period is also characterized by the adoption of agriculture and the more sedentary settlement patterns associated with it. However, no strong evidence to suggest the practice of agriculture is present in the region.

Historic contact period sites are recognized by the presence of Spanish and French trade goods in association with lithic and ceramic materials (Jelks, 1967). The Norteno Focus, which may represent the descendants of the preceding Henrietta Focus, is attributed to Wichita-speaking peoples during the historic period in this region (Duffield and Jelks, 1961).

Jacksboro is the largest town and county seat of Jack County. Present day Jack County was originally included in the Texas Emigration Land Company. Jack County was organized in August 1856 and named for William and Patrick Jack, participants in the Texas Revolution. Mesquiteville, designated as the county seat, was later renamed Jacksboro. The Butterfield-Overland Mail route crossed the county. Fort

Richardson, constructed between 1867 and 1869 by the United States Army, was the most northern of the Texas forts to protect pioneers from frontier hostilities. It was abandoned in 1878. Jack county residents voted against secession in February 1861. The Chicago, Rock Island and Texas Railway reached Jacksboro in 1898, bringing economic development and access to markets outside the county. With the turn of the twentieth century and more efficient market transportation available, large-scale farming of grains and cotton, as well as livestock production increased. Oil was discovered near Bryson in 1923 and continues to contribute to local development (Texas State Historical Association, 2002a).

Wise County, located 40 miles south of the Texas-Oklahoma border, is divided north to south between the Eastern Grand Prairie and the Western Cross Timbers regions of Texas. It was established in 1856, and named in honor of Henry A. Wise, a United States Congressman from Virginia, who supported the annexation of Texas to the United States. Originally named Taylorsville, Decatur was selected as the county seat in a countywide election. The majority of settlers in Wise County emigrated from the southern states and supported secession in 1861. The county raised five Confederates companies that fought in the Civil War. Decatur was a stop on the Butterfield Overland Mail route from St. Louis, Missouri, to San Francisco, California. For over 20 years after the Civil War the Eastern Cattle trail to Abilene, Kansas, crossed Wise County east of Decatur. Two railroads, the Fort Worth and Denver City and the Rock Island were constructed through Wise County during the 1880s and 1890s, stimulating the production of coal at Bridgeport and agricultural products from the eastern section of the county (Texas State Historical Association 2002b).

4.8.2 Previous Archaeological Investigations

The most intensive investigations conducted in Jack County have been conducted at Site 41JA2, the Fort Richardson Historic Site (Dessamae, 1972; Roberson and Ing, 1974; Dickson and Westbury; 1976; Westbury, 1976; Black and Kegley, 1998).

Several investigations conducted in the 1980s that were limited in areal scope (Guffee, 1980; Fox, 1981; Scott and Cole, 1986; State Department of Highways and Public Transportation (SDHPT), 1987) resulted in no new cultural resource sites recorded. Archaeological investigations were also conducted for the proposed Lost Creek Reservoir Boat Ramp (Briggs, 1991). A total of 6.9 ac were surveyed and no sites were recorded. In 1991, the SDHPT did a cultural resource assessment for a bridge replacement along County Road 176 at Cameron Creek. Approximately 0.5 ac was surveyed and no cultural resource sites were identified. Two TxDOT projects (TxDOT 1995a, 1995b, 1996) did not identify any archaeological sites. More recently, the TPWD surveyed and tested approximately 660 ac including portions of Jack County. Four previously unrecorded sites were recorded, 41JA7 to 41JA10. These sites are all within the confines of Fort Richardson State Park.

4.8.3 Records and Literature Review

A literature and records review was conducted for the project area. The purpose of the file review was to determine the location of recorded cultural resource sites within the project area boundaries and to determine the density and type of unrecorded cultural resource sites that might be expected.

The cultural resource files at TARL and at the Texas Historical Commission (THC) were reviewed for sites located within the project area. A search was conducted of both published and unpublished NRHP data for sites listed on or determined eligible for the NRHP. The list of SALs compiled by the THC was reviewed for sites determined significant by the state. In addition, a search was conducted of NRHP roads and bridges listed in TxDOT databases. The Texas Historical Marker Program and Historic Cemetery Program records of the THC were also reviewed, using historic general highway maps of the project area (SDHPT, 1936a, 1936b, 1948, 1949) were also reviewed. Cemeteries in Jack and Wise counties were reviewed through county databases and maps. In addition, the Texas Department of Agriculture's (TDA) Family Land Heritage Program listings were reviewed for possible Century Farm or Ranch locations within the project area.

The TARL records identified 17 recorded archaeological sites in Jack County. The THC files identified four NRHP listed properties (two of them bridges), one SAL designated site, 31 Official Texas Historic Markers (OTHM) and two historic cemeteries in the county. Also in the county are ten Century Farms or Ranches.

The Wise County records identified 57 recorded archaeological sites, five NRHP-listed properties, one SAL-designated site, 74 OTHMs, and one THC Historic Cemetery. There are 24 Century Farms or Ranches and one NRHP-listed bridge in the county.

5.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

5.1 CLIMATOLOGY AND AIR QUALITY IMPACTS

5.1.1 Construction Impacts

Pollutant emissions from the construction of the proposed project will result in some effects to air quality in the area immediately surrounding the construction activity. These effects will be areally localized and of short duration.

During construction, fugitive dust emissions will be produced on-site by heavy earth-moving equipment involved in construction activities and by vehicular traffic traveling over temporary unpaved roads. The quantity of these emissions will vary on a day-to-day basis, depending on the area of land being worked, the level of activity, the specific construction activities, and the prevailing weather conditions. Particulate matter will be generated by individual operations in short spurts, whenever any loose material is disturbed. Emitting activities will be generally intermittent, lasting from a few seconds to a few minutes. Examples of such activities include dumping dirt into or out of a dump truck, driving over an unpaved road, and exposing unprotected stockpiles to gusty winds.

The net result will be that ambient concentrations of fugitive dust emissions will decrease very rapidly with increasing distance from the source so that off-property particulate levels will exceed current ambient levels only occasionally. Increases in ambient concentrations will be most likely to occur during dry windy conditions in the late spring. Such conditions usually last for less than 24 hours, during which time particulate emissions due to construction would be superimposed upon naturally occurring emissions of windblown dust, thereby constituting a recurring, short-term, minor adverse impact.

Vehicular exhaust emissions will be produced by the operation of diesel engines and other construction equipment. These mobile source emissions will include small amounts of carbon monoxide, hydrocarbons, and nitrogen oxides, but they are not expected to cause exceedance of any federal or state air quality standards. On-site concentrations of vehicular exhaust emissions may be sufficiently high in the immediate vicinity of the source for diesel odor to be detected. The vehicles will generally be operating singly or in groups of small numbers, and they will always be operating in the open. This situation (a low density of emissions coupled with good atmospheric dispersion) means that the off-site ambient effects of diesel emissions will be near or below the detection limits of routine field equipment, resulting in very minor adverse impacts.

On-site burning of trees, brush, and other plant growth for land clearing operations is allowed under TNRCC Rule 111.209 when no practical alternative to burning exists and when the materials are generated only from that property. Such burning will be subject to the general requirements of TNRCC Rule 111.219 which are designed to ensure that outdoor burning is conducted safely and with minimal

impact on surrounding areas. Rule 111.219 contains requirements and restrictions related to meteorological conditions, impacts of smoke on highways and roads, impacts of smoke on structures at neighboring properties, hours of the day burning is allowed, and attendance by a responsible person during the active burn phase.

5.1.2 Operation Impacts

In order to receive approval of required air permits, BEPC must demonstrate that the proposed project will be capable of meeting several specific air quality criteria on a continuing basis. In meeting these criteria, BEPC will ensure that all environmental effects will be at acceptable levels even when the units are operating at the worst-case scenario. The permit applications will be subjected to intensive and comprehensive agency review, public scrutiny, and, potentially, a public hearing before they can be approved. The combustion turbines will be required to utilize best available control technology (BACT) with consideration given to the technical practicability and the economic reasonableness of reducing or eliminating emissions from the facility. BEPC has completed the air dispersion modeling for the proposed project. Duke Energy North America (DENA) will be submitting the air permit application to the TCEQ by March 28, 2003, on behalf of BEPC to facilitate permit issuance by the TCEQ.

5.1.2.1 Federal Applicability

1. These facilities shall comply with applicable requirements of the U.S. Environmental Protection Agency (EPA) Regulations on Standards of Performance for New Stationary Sources, Title 40 Code of Federal Regulations Part 60 (40 CFR Part 60), Subpart A, General Provisions and the following:

   A. Subpart Da, Electric Utility Steam Generating Units;

   B. Subpart Dc, Small Industrial-Commercial-Institutional Steam Generating Units; and

   C. Subpart GG, Stationary Gas Turbines.

   If any condition of this permit is more stringent than the regulations so incorporated, then for the purposes of complying with this permit, the permit shall govern and be the standard by which compliance shall be demonstrated.

5.1.2.2 Emission Standards and Operating Specifications

2. The two General Electric Model 7FA or equivalent combustion turbine generator (CTG) units shall normally operate between 85 and 170 megawatts (without duct burner firing). Reduced load operation is authorized to accommodate periods of reduced power demands provided the maximum pounds per hour (lbs/hr) emission rates specified in the attached table entitled "Emission Sources - Maximum Allowable Emissions Rates" for Emission Point Nos. (EPNs) HRSG-1 or HRSG-2 are not exceeded.
3. The two heat recovery steam generating (HRSG) unit duct burners are each limited to a maximum heat input of 600 MMBtu/hr based on the higher heating value of the fuel.

4. Fuel-fired in the CTGs, duct burners, and auxiliary boiler is limited to pipeline-quality natural gas containing no more than 2.0 grains total sulfur per 100 dscf.

5. Upon request by the Executive Director of the Texas Commission on Environmental Quality (TCEQ) or any local air pollution control program having jurisdiction, the holder of this permit shall provide a sample and/or an analysis of the fuel fired in the CTGs and duct burners, or shall allow air pollution control agency representatives to obtain a sample for analysis. A custom fuel monitoring plan as required under 40 CFR Part 60 Subpart GG, and approved by the TCEQ Executive Director, shall be employed to monitor the sulfur content of the natural gas.

6. HRSG Stack Emission Limits: The limitations of this condition shall only apply when the CTG is operating in its normal operating range as specified in Special Condition No. 2. The limitations of this condition shall apply regardless of whether the duct burners are firing. Emissions from maintenance, start-up, and shutdown activities are exempt from the limitations of this condition. The concentration limits in this condition are based on a three hour average.

   A. Emissions of nitrogen oxides (NO_x) shall not exceed 5 ppmvd at 15 percent oxygen (O_2).

   B. Emissions of carbon monoxide (CO) shall not exceed 26 ppmvd at 15 percent O_2.

   C. Emissions of volatile organic compounds (VOC), defined as total hydrocarbons minus methane and ethane, shall not exceed 10.0 ppmvd at 15 percent O_2.

   D. Emissions of ammonia (NH_3) shall not exceed 7 ppmvd at 15 percent O_2.

7. Opacity of emissions from all stack sources covered by this permit shall not exceed 5 percent averaged over a six-minute period, except during periods of maintenance, start-up, or shutdown. Opacity shall be determined by EPA Reference Method No. 9.

8. The ammonia stored and handled at the facility shall be in aqueous solution and shall contain no more than 30 percent ammonia by mass.

5.1.2.3 Initial Determination of Compliance

9. Sampling ports and platforms shall be incorporated into the design of the HRSG exhaust stacks according to the specifications set forth in the attachment entitled "Chapter 2, Stack Sampling Facilities." Alternate sampling facility designs may be submitted for approval by the TCEQ Regional Director or the Director of the TCEQ Austin Enforcement Division, Engineering Services Team.

10. The holder of this permit shall perform stack sampling and other testing as required to establish the actual quantities of air contaminants being emitted into the atmosphere from EPNs HRSG-1 and HRSG-2, and to determine initial compliance with all emission limits established by this permit. Sampling shall be conducted in accordance with the appropriate procedures of the TCEQ *Sampling Procedures Manual* and in accordance with the appropriate EPA Reference Methods 201A and 202 or Reference Method 5, modified to include back-half condensibles, for the concentration of particulate matter less than 10 microns in diameter (PM_{10}); Reference Method 8 or Reference Methods 6 or 6c for sulfur dioxide (SO_2); Reference Method 9 for opacity (consisting of 30 six-minute readings as provided in 40 CFR § 60.11[b]); Reference Method 10 for the concentration of CO; Reference Method 25A, modified to exclude methane and ethane, for the concentration of

VOC (to measure total carbon as propane); and Reference Method 20 for the concentrations of NO_x and O_2; or other equivalent methods approved by the Director of the TCEQ Austin Enforcement Division, Engineering Services Team.

Fuel sampling using the methods and procedures of 40 CFR § 60.335(d) may be conducted in lieu of stack sampling for SO_2. If fuel sampling is used, compliance with New Source Performance Standards (NSPS), Subpart GG, SO_2 limits shall be based on 100 percent conversion of the sulfur in the fuel to SO_2. Any deviations from those procedures must be approved by the Executive Director of the TCEQ prior to sampling. The TCEQ Executive Director or TCEQ designated representative shall be afforded the opportunity to observe all such sampling. The holder of this permit is responsible for providing sampling and testing facilities and conducting the sampling and testing operations at his expense.

A. The TCEQ Abilene Regional Office shall be contacted as soon as testing is scheduled but not less than 45 days prior to sampling to schedule a pretest meeting.

   The notice shall include:

   1) Date for pretest meeting.
   2) Date sampling will occur.
   3) Name of firm conducting sampling.
   4) Type of sampling equipment to be used.
   5) Method or procedure to be used in sampling.
   6) Procedure used to determine CTG loads during and after the sampling period.

   The purpose of the pretest meeting is to review the necessary sampling and testing procedures, to provide the proper data forms for recording pertinent data, and to review the format procedures for submitting the test reports. A written proposed description of any deviation from sampling procedures specified in permit conditions, or TCEQ or EPA sampling procedures shall be made available to the TCEQ prior to the pretest meeting. The TCEQ Regional Director or the Director of the TCEQ Enforcement Division, Engineering Services Team shall approve or disapprove of any deviation from specified sampling procedures. Requests to waive testing for any pollutant specified in this condition shall be submitted to the TCEQ Office of Permitting, Remediation, and Registration, Air Permits Division. Test waivers and alternate/equivalent procedure proposals for NSPS testing which must have EPA approval shall be submitted to the TCEQ Austin Enforcement Division, Engineering Services Team.

B. Air emissions from each HRSG exhaust stack shall be tested while firing the CTG and duct burner at full load (approximately 310 MW) for the ambient conditions at the time of testing. Air emissions to be sampled and analyzed at this load include (but are not limited to) NO_x, O_2, CO, VOC, formaldehyde, SO_2, and PM_{10}. (Fuel sampling using the methods and procedures of 40 CFR § 60.335[d] may be conducted in lieu of stack sampling for SO_2.)

C. Air emissions from each HRSG exhaust stack shall also be tested while firing the CTG only (without the duct burner) at full load (approximately 170 MW) for the ambient conditions at the time of testing. Air emissions to be sampled and analyzed at this load

include (but are not limited to) NO_x, O_2, CO, VOC, formaldehyde, SO_2, and PM_{10}. (Fuel sampling using the methods and procedures of 40 CFR § 60.335[d] may be conducted in lieu of stack sampling for SO_2.)

D. Air emissions from each HRSG exhaust stack shall also be tested while firing the CTG only (without the duct burner) at minimum load (approximately 85 MW). Air emissions to be sampled and analyzed at this load include (but are not limited to) VOC and NH_3.

E. Sampling of each CTG shall occur within 60 days after achieving the maximum production rate at which each CTG will be operated but no later than 180 days after initial start-up of each unit. Additional sampling shall occur as may be required by the TCEQ or EPA.

F. Within 60 days after the completion of the testing and sampling required herein, two copies of the sampling reports shall be distributed as follows:

- One copy to the TCEQ Abilene Regional Office.
- One copy to the EPA Region 6 Office, Dallas.

5.1.2.4 CONTINUOUS DETERMINATION OF COMPLIANCE FOR CO and NO_x

11. The holder of this permit shall install, calibrate, maintain, and operate a continuous emission monitoring system (CEMS) to measure and record the concentrations of NO_x, CO, and O_2 from each HRSG Exhaust Stack (EPNs HRSG-1 and HRSG-2).

A. Monitored NO_x and CO concentrations shall be corrected and reported in dimensional units corresponding to the emission rate and concentration limits specified in Special Condition No. 6.

B. The CEMS shall meet the design and performance specifications, pass the field tests, and meet the installation requirements and the data analysis and reporting requirements specified in the applicable Performance Specification Nos. 1 through 9, 40 CFR Part 60, Appendix B or an acceptable alternative. If there are no applicable performance specifications in 40 CFR Part 60, Appendix B, contact the TCEQ Office of Permitting, Remediation, and Registration, Air Permits Division in Austin for requirements to be met.

C. The CEMS shall meet the applicable quality-assurance requirements specified in 40 CFR Part 60, Appendix F, Procedure 1 or an acceptable alternative. All CEMS downtime of one hour or greater shall be recorded by the CEMS. Any relative accuracy exceedances, as specified in 40 CFR Part 60 Appendix F § 5.2.3, shall be reported to the appropriate TCEQ Regional Director, and necessary corrective action shall be taken in accordance with 40 CFR Part 60 Appendix F § 7.

D. The monitoring data shall be reduced to hourly average values at least once everyday, using a minimum of four equally-spaced data points from each one-hour period. Two valid data points shall be generated during the hourly period in which zero and span is performed.

E. The holder of this permit shall either measure or develop a program to calculate the total mass flow rate through each HRSG stack to ensure continuous compliance with the NO_x

and CO emission limitations specified in the MAERT. For each 24-hour period, the holder of this permit shall calculate hourly mass emissions in lbs/hr using the measured exhaust flow rate and the measured concentrations from the NO_x and CO CEMS. Each month, the holder of this permit shall aggregate the hourly calculated values to tons per year on a rolling 12-month basis. These calculated values shall be stored on a computer hard drive and on individually stored disks or other TCEQ-accepted computer media. Records of this information will also be available in a form suitable for inspection.

F. The TCEQ Abilene Regional Office shall be notified at least 30 days prior to any required relative accuracy test audit in order to provide them the opportunity to observe the testing.

G. If applicable, the CEMS will be required to meet the design and performance specifications, pass the field tests, and meet the installation requirements and data analysis and reporting requirements specified in the applicable performance specifications in 40 CFR Part 75, Appendix A. 40 CFR Part 75 is deemed an acceptable alternative to the performance specifications and quality assurance requirements of 40 CFR Part 60.

5.1.2.5 Continuous Determination of Compliance For NH_3

12. The NH_3 concentration in each Exhaust Stack shall be tested or calculated according to one of the methods listed below and shall be tested or calculated according to frequency listed below. Testing for NH_3 slip is only required on days when the Selective Catalytic Reduction (SCR) unit is in operation.

    A. The holder of this permit may install, calibrate, maintain, and operate a CEMS to measure and record the concentrations of NH_3. The NH_3 concentrations shall be corrected and reported in accordance with Special Condition No. 6D.

    B. As an approved alternative, the NH_3 slip may be measured using a sorbent or stain tube device specific for NH_3 measurement in the 5 to 10 ppm range. The frequency of sorbent/stain tube testing shall be daily for the first 60 days of operation, after which, the frequency may be reduced to weekly testing if operating procedures have been developed to prevent excess amounts of NH_3 from being introduced in the SCR unit and when operation of the SCR unit has been proven successful with regard to controlling NH_3 slip. Daily sorbent or stain tube testing shall resume when the catalyst is within 30 days of its useful life expectancy. These results shall be recorded and used to determine compliance with Special Condition No. 6D.

    C. As an approved alternative to sorbent/stain tube testing or an NH_3 CEMS, the permit holder may install and operate a second NO_x CEMS probe located between the duct burners and the SCR, upstream of the stack NO_x CEMS, which may be used in association with the SCR efficiency and NH_3 injection rate to estimate NH_3 slip. This condition shall not be construed to set a minimum NO_x reduction efficiency on the SCR unit. These results shall be recorded and used to determine compliance with Special Condition No. 6D.

    D. If the measured or calculated ammonia slip concentration exceeds 6 ppm at any time, the permit holder shall begin NH_3 testing by either the Phenol-Nitroprusside Method, the Indophenol Method, or EPA Conditional Test Method (CTM) 27 on a quarterly basis, in

addition to the weekly sorbent or stain tube testing. The quarterly testing shall continue until such time as the SCR unit catalyst is replaced; or if the quarterly testing indicates NH_3 slip is 5 ppm or less, the Phenol-Nitroprusside/Indophenol/CTM 27 tests may be suspended until sorbent/stain tube testing again indicate 6 ppm NH_3 slip or greater. These results shall be recorded and used to determine compliance with Special Condition No. 6D.

E. As an approved alternative to sorbent or stain tube testing, NH_3 CEMS, or a second NO_X CEMS, the permit holder may install and operate a dual stream system of NO_X CEMS at the exit of the SCR. One of the exhaust streams would be routed, in an unconverted state, to one NO_X CEMS and the other exhaust stream would be routed through a NH_3 converter to convert NH_3 to NO_X and then to a second NO_X CEMS. The NH_3 slip concentration shall be calculated from the difference between the two NO_X CEMS readings (converted and unconverted).

F. Any other method used for measuring NH_3 slip shall require prior approval from the TCEQ Austin Enforcement Division, Air Section, Engineering Services Team.

13. If any emission monitor fails to meet specified performance, it shall be repaired or replaced as soon as practical, but no later than seven days after it was first detected by any employee at the facility, unless written permission is obtained from the TCEQ which allows for a longer repair/replacement time. The holder of this permit shall develop an operation and maintenance program (including stocking necessary spare parts) to ensure that the continuous monitors are available as required.

14. The holder of this permit shall additionally install, calibrate, maintain, and operate continuous monitoring systems to monitor and record the average hourly natural gas consumption of the CTGs and the duct burners. The systems shall be accurate to ± 5.0 percent of the units maximum flow.

15. The holder of this permit shall monitor the fuel fired in the CTGs and duct burners for fuel-bound sulfur as specified in 40 CFR 60.334(b). Any request for a custom monitoring schedule shall be made in writing and directed to the Executive Director of the TCEQ, although authority for granting such custom schedules remains with the EPA. Any custom schedule approved by EPA pursuant to 40 CFR § 60.334(b) will be recognized as enforceable conditions of this permit provided that the holder of this permit demonstrates that the conditions of such custom schedule will be adequate to demonstrate continuous compliance with Special Condition No. 4.

5.1.2.6 Recordkeeping Requirements

16. The following records shall be kept at the plant for the life of the permit. All records required in this permit shall be made available at the request of personnel from the TCEQ, EPA, or any air pollution control agency with jurisdiction.

A. A copy of this permit.

B. A complete copy of the testing reports and records of the initial performance testing completed pursuant to Special Condition No. 10 to demonstrate initial compliance.

C. Stack sampling results or other air emissions testing (other than CEMS data) that may be requested by the Executive Director on units authorized under this permit.

17. The following information shall be maintained by the holder of this permit in a form suitable for inspection for a period of two years after collection and shall be made available as soon as practical upon request to representatives of the TCEQ, EPA, or any local air pollution control program having jurisdiction:

    A. The CEMS data of NO_X, CO, and O_2 emissions from EPNs HRSG-1 and HRSG-2 to demonstrate compliance with the emission rates listed in the MAERT.

    B. Raw data files of all CEMS data including calibration checks and adjustments and maintenance performed on these systems in a permanent form suitable for inspection.

    C. Records of the hours of operation and average daily quantity of natural gas fired in the CTGs, duct burners, and auxiliary boiler.

    D. Records of NH_3 emissions sampling and calculations pursuant to Special Condition No. 12.

5.1.2.7 Reporting

18. Within 270 days after the start of operations, the holder of this permit shall submit to the TCEQ Office of Permitting, Remediation, and Registration, Air Permits Division a permit alteration request to adjust emission estimates for VOC in Special Condition No. 6 and the MAERT if the emission rate of VOC as measured during the initial determination of compliance stack sampling is less than 90 percent of its emission estimate in the MAERT.

19. The holder of this permit shall submit to the TCEQ Abilene Regional Office and the Air Enforcement Branch of EPA in Dallas periodic reports as described in 40 CFR § 60.7. Such reports are required for each emission unit which is required to be continuously monitored pursuant to this permit.

The following table (Table 5.1) lists the maximum allowable emission rates and all sources of air contaminants on the applicant's property covered by this permit. The emission rates shown are those derived from information submitted as part of the application for permit and are the maximum rates allowed for these facilities. Any proposed increase in emission rates may require an application for a modification of the facilities covered by this permit.

Emission Sources – Maximum Allowable Emission Rates
Permit Numbers 52756 and PSD-TX-1026

		Air Contaminants Data		
Emission	Source	Air Contaminant	Emission Rates *	
Point No. (1)	Name (2)	Name (3)	lb/hr	TPY**
HRSG-1	Combustion Turbine with 550 MMBtu/hr Duct Burner	NO_x	45.3	187.0
		CO	87.3	364.0
		VOC	20.6	86.7
		PM_{10}	34.7	149.0
		SO_2	14.5	58.7
		NH_3	23.4	96.8

Emission Sources – Maximum Allowable Emission Rates
Permit Numbers 52756 and PSD-TX-1026
(continued)

Emission Point No. (1)	Source Name (2)	Air Contaminants Data: Air Contaminant Name (3)	Emission Rates *: lb/hr	Emission Rates *: TPY**
HRSG-2	Combustion Turbine with 550 MMBtu/hr Duct Burner	NO_x	45.3	187.0
		CO	87.3	364.0
		VOC	20.6	86.7
		PM_{10}	34.7	149.0
		SO_2	14.5	58.7
		NH_3	23.4	96.8
CTVs 1 thru 10	Cooling Tower Vents (4)	PM	3.0	13.1
		PM_{10}	0.4	1.9
FUG-1	Power Block 1 Fugitive Emissions (5)	VOC	<0.01	<0.02
FUG-2	Power Block 2 Fugitive Emissions (5)	VOC	<0.01	<0.02
FUG-3	N.G. Meter Skid Fugitive Emissions (5)	VOC	<0.01	<0.01
OWS-1	Oil-Water Separator	VOC	0.40	1.1
FWP-TK	Fire Water Pump Storage Tank	VOC	<0.01	<0.01
B-1	Auxiliary Boiler	NO_x	1.3	3.9
		CO	1.4	4.1
		VOC	0.6	1.8
		PM_{10}	0.4	1.1
		SO_2	0.3	0.7
FWP-1	Firewater Pump Engine (6)	NO_x	6.2	1.6
		CO	3.8	1.0
		VOC	0.5	0.2
		PM_{10}	0.5	0.2
		SO_2	0.5	0.1
CVs 1 thru 16	Chiller Vents	PM	0.8	3.5
		PM_{10}	0.2	0.6
DG-1	Diesel Generator Engine (6)	NO_x	20.8	5.2
		CO	12.6	3.2
		VOC	1.7	0.5
		PM_{10}	1.5	0.4
		SO_2	1.4	0.4

Emission Sources – Maximum Allowable Emission Rates
Permit Numbers 52756 and PSD-TX-1026
(continued)

Emission Point No. (1)	Source Name (2)	Air Contaminants Data: Air Contaminant Name (3)	Emission Rates *: lb/hr	Emission Rates *: TPY**
DG-TK	Diesel Generator Engine Storage Tank	VOC	0.2	<0.01
ACID-TK	Acid Storage Tank	H_2SO_4	0.2	<0.01
NH3-Fugitives	Ammonia Storage Tank	NH_3	<0.01	<0.01

(1) Emission point identification - either specific equipment designation or emission point number (EPN).
(2) Specific point source name. For fugitive sources use area name or fugitive source name.
(3) VOC - volatile organic compounds as defined in Title 30 Texas Administrative Code § 101.1
NO_x - total oxides of nitrogen
CO - carbon monoxide
SO_2 - sulfur dioxide
PM - particulate matter, suspended in the atmosphere, including PM_{10}.
PM_{10} - particulate matter equal to or less than 10 microns in diameter. Where PM is not listed, it shall be assumed that no particulate matter greater than 10 microns is emitted.
H_2SO_4 - sulfuric acid
(4) Cooling tower PM and PM_{10} emissions are an estimate only based on manufacturers' data. Cooling tower assembly has ten vent fan exhausts; emissions are sum-total of all ten exhausts.
(5) Fugitive emissions are an estimate based on component count and applicable fugitive emission factors.
(6) Emissions are based on non-emergency operation of 500 operating hours per year.
* Emission rates are based on an operating schedule of 8,760 hours/year.
** Compliance with the annual emission limits shall be based on a rolling 12-month year rather than the calendar year.

5.2 GEOLOGY AND SOILS

No significant impacts to the topography or geological resources of the project area or site are anticipated as a result of the proposed project. Construction will require the removal and/or disturbance of small amounts of near-surface materials, yet the construction will have no measurable effect on the geological features or resources of the project area and will create few long-term adverse impacts on soils.

To reduce potential erosion areas, the grading of temporary roads, construction areas, staging areas or other areas where vegetation is removed will be minimized. Inspection both during and after construction will ensure that problem erosion areas (if any) are identified. These areas will be restored to their pre-construction conditions where possible, and if needed, stabilized by grading parallel to the landscape contours in a manner that conforms to the natural topography as much as possible, and by reseeding the area.

Potential impacts to soils include compaction and increased erosion where vegetation is cleared. Natural succession will revegetate the majority of the project disturbance; however, revegetation of disturbed soils will further reduce potential impacts by erosion. Special precautions will be taken to minimize vehicular traffic, thereby reducing soils compaction. Nevertheless, the most important factor in controlling soil erosion associated with construction activity is to revegetate areas that have potential erosion problems immediately following construction. To further minimize potential impacts to soils, sedimentation and erosion controls such silt fences, etc. will be used. Erosion control measures will be installed prior to any disturbance and will be removed after restoration is complete.

Prime farmland soils, as defined by the NRCS, are soils that are best suited to producing food, feed, forage, or fiber crops. The USDA recognizes the importance and vulnerability of prime farmlands throughout the nation and, therefore, encourages the wise use and conservation of these soils where possible. Within the project area, there are soils that are considered prime farmland soils (USDA, 1992). However, there are no prime farmland soils on the power plant site (Greenwade, 2003). The remaining prime farmland soils are located in various portions of the utilities corridor. Potential erosion impacts to these prime farmland soils from the construction of pipelines or overhead electric transmission lines are anticipated to be insignificant. Construction-related erosion poses the primary concern of impact to prime farmland soils, especially during clearing activities. However, these impacts, if any, are usually temporary and no long-term adverse impacts to prime farmland soils within the project area are anticipated.

5.3 WATER RESOURCES

5.3.1 Water Resource Impacts

The proposed power plant discharge is not likely to have any adverse impacts to waters within the project area. Power plant discharge will be carried from the plant site via pipeline to the Bridgeport (City) waste water treatment system. Discharged water will be treated to established water quality parameters as per required regulations before final release into approved receiving waters.

A Zero Liquid Discharge (ZLD) system is being installed at the plant to recycle all process wastewater. All storm water runoff will be per state and federal regulations and tested periodically for any contaminants.

5.3.2 Stormwater Impacts

If contaminants enter the storm sewer system, they can be discharged to local creeks, thereby impacting the stream ecosystems. All storm water from the transformer area must be treated in an oil-water separator system before discharge. Stormwater from the rest of the facility will leave the site as sheet or channel flow into surrounding land and into Jasper Creek or other nearby discharge location. Because the power facility is not expected to be a major source of water pollutants, no significant adverse impacts are

expected. However, stormwater runoff from parking lots and other impervious surfaces may contain high levels of TSS, oil and grease, FC and other constituents, and may cause some water quality impacts to the immediate downstream, especially during the first flush period. Therefore, a stormwater pollution prevention plan (SWPPP) is required as part of the power plant's stormwater management and permitting plan. This stormwater plan should include the necessary best management practices (BMPs) to prevent adverse impacts due to stormwater runoff from occurring.

5.3.3 Construction Phase Impacts

During the construction phase of the power station and transmission lines, earth movement and excavation will take place, and heavy machinery will be operated on site. Soil disturbance from construction activities can contribute to soil erosion leading to increased sediment inputs to Jasper Creek, Willow Creek, Boons Creek, Coal Creek and other minor creeks. To a lesser degree, oil and grease and other constituents can be present in the stormwater runoff from the construction site. There is also the potential for increased soil compaction at stream crossings. Vehicular traffic should be minimized to reduce the impacts of compaction. A stormwater pollution prevention plan should be prepared during the permit application process that addresses the BMPs necessary to minimize stormwater impacts. The site should be restored to pre-construction conditions, where possible, by grading parallel to landscape contours in a manner that conforms to the natural topography as much as possible, and by reseeding the area.

5.3.4 Floodplain Impacts

The Wise County Flood Insurance Rate Maps (FIRMs) indicate approximate 100-year floodplains (zone A) and zone X for Lake Bridgeport and adjacent creeks. It is likely that the construction of the proposed transmission lines and subsequent grading may result in altered floodplains for the crossing creeks such as Willow Creek, Boons Creek and Coal Creek. These impacts can be quantified and included in updated FIRMs when a detailed Flood Insurance Study (FIS) is conducted.

There is currently no 100-year floodplain delineated at the location of the proposed power plant in Jack County. Jasper Creek flows west of the proposed power plant. From the extent of the 100-year floodplain of creeks further east such as Willow Creek, it appears that the power plant is not likely to impact the floodplain of Jasper Creek. The floodplain of Jasper Creek could be mapped at the location of the proposed power plant to confirm this.

5.3.5 Ground Water Impacts

5.3.5.1 Aquifer Hydraulics

Based on data from the TRWD, the conservation storage of Lake Bridgeport is 386,539 ac-ft and the conservation pool elevation is 836 ft. Maximum storage is 923,817 ac-ft. There appears to be sufficient water for power generation in the lake and no additional water is needed from ground water.

Lake water balance studies and long term records can indicate if volumes and water levels encountered during dry periods are sufficient for the proposed power plant operations. If low water levels in the lake during dry periods are a concern, alternatives to pump ground water need to be explored. This ground water may be needed for cooling purposes, for example. A detailed knowledge of the aquifer properties would then become necessary. In such a situation, aquifer properties such as transmissivity can be estimated using pumping tests. The interaction between the lake and ground water levels could also be studied.

To operate the plant at base load without peak firing, the water requirements is 3.8 MGD. To fully duct fire the units for 5 hours, the plant needs an additional 1.3 MGD for a total of 5.1 MGD. The Zero Liquid Discharge system will recycle .75 MGD of process wastewater, and an additional .6 MGD of effluent water will be purchased from the city of Bridgeport or Jacksboro.

5.3.5.2 Impacts to Surrounding Wells

The proposed power plant will obtain water for operating purposes from Lake Bridgeport. Because ground water is not being used as a source (except for potable water supplied from an on-site well), there should not be any impact to surrounding wells from the proposed power plant. However, low flow periods may be monitored to study any potential lowering of ground water levels following lake water withdrawals.

Storage tanks with fuel and related products may leak or get ruptured and the infiltration of these products into the aquifer can adversely impact ground water quality. The potential for such impacts should be reduced using suitable BMPs.

5.4 ECOLOGY

5.4.1 Vegetation

The primary impact to vegetation that would result from the construction of the proposed power plant is the permanent removal of existing vegetation. On January 7, 2003, a ground reconnaissance survey was conducted for the proposed power plant site. During the ground reconnaissance survey the dominant vegetation community identified was a pastureland community as well as a small tract of woodlands limited to the riparian zone of a tributary to Jasper Creek.

Of the 200-acre plant site, approximately 50 acres will require site cleaning. The gas and water pipeline make up approximately 21 miles of right-of-way easements. The construction easement is 50 feet wide and the pipeline easement for the gas and water pipeline is 50 feet. This equates to approximately 12 full acres of vegetation that will be impacted and refurbished.

The pastureland vegetation community is dominated by Bermuda grass (*Cynodon dactylon*) western ragweed (*Ambrosia psilostachya*), old field threeawn (*Aristida oligantha*), some honey mesquite (*Prosopis glandulosa*), and various other native herbaceous vegetation. The woodland vegetation community is dominated by post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), hawthorn (*Crataegus* spp.), and green briar (*Smilax* spp.). In addition to the permanent impacts to the above vegetation communities some surrounding vegetation may become coated with fugitive dust, however this is expected to be minor and temporary.

On March 5, 2003, a windshield survey was conducted of the utilities corridor. The majority of the vegetation communities observed within the corridor consisted of a pastureland vegetation community, however some upland woodland, bottomland/riparian hardwood forest, and cutover/regenerative areas were also observed within the corridor project area.

The primary impact to vegetation that would result within the corridor from the construction of pipelines and overhead electric transmission lines is the removal of existing vegetation within the proposed corridor area. Vegetation removed for the construction of the pipelines and electric transmission lines will be allowed to regenerate through natural succession within the proposed alignments, but only to a density and vertical growth that will allow for the continued maintenance and operation of the pipeline(s) and electric transmission line(s).

5.4.2 Wildlife

The impacts of the proposed project on wildlife can be divided into short-term effects resulting from physical disturbance during construction and long-term effects resulting from habitat modification. The net effect of these two types of impacts on local wildlife would be minor. Clearing and construction will directly and/or indirectly affect most animals that usually reside or wander within the project area. Some small, low-mobility forms may be killed by the heavy construction machinery. These include several species of amphibians, retiles, mammals and, if construction occurs in the breeding season, the young of species, including nestling and fledgling birds. Fossorial animals (i.e., those that live underground) such as mice and shrews may similarly be negatively impacted as a result of soil compaction caused by heavy construction machinery. Animals in their dens, especially while dormant, could be impacted by excavation. Large, more-mobile species such as birds, raccoons and coyotes would likely avoid the initial clearing and construction activities and move into adjacent areas outside the project site.

Vegetation provides habitat (shelter and food) for wildlife as well as habitat for prey of predatory species. Construction activities may cause wildlife in the area to experience a slight loss of browse or forage

material. However, the prevalence of similar habitats in adjacent areas should minimize the effects of this loss.

The increased noise and activity levels as well as fugitive dust during construction could potentially disturb breeding or other activities of species inhabiting the areas adjacent to the project area. However, these impacts are expected to be temporary. Although the normal behavior of some wildlife species may be disturbed during construction, little permanent damage to the population of such organisms would result.

There will likely be several future electric transmission lines that originate from the power plant site. Their exact locations and alignments have not been determined at this time. It is likely that an alternative routing study/environmental assessment report will be prepared for these lines in support of an application for a Certificate of Convenience and Necessity from the Public Utility Commission of Texas. These lines will also undergo environmental review by RUS. To the extent reasonable and feasible, these electric transmission lines will utilize or follow existing rights-of-way and property lines to reduce potential land use and environmental impacts.

5.4.3 Wetlands

During the January 2003 ground reconnaissance survey of the proposed power plant site, no jurisdictional wetlands were identified. Thus, no impacts to wetlands will occur as a result of the proposed power plant construction. However, impacts to the head waters of an intermittent stream channel, a jurisdictional water of the U.S., are anticipated. Approximately 1,600 linear-feet of the intermittent tributary to Jasper Creek will be permanently filled by the construction of the proposed power plant. At the time of the January 2003 site visit, little or no water was observed within the stream channel. The average ordinary high water mark of this intermittent tributary is approximately 5 feet.

As per the USACE, the proposed power plant site and associated infrastructure would need to be permitted in a single submittal (i.e., single permit application). Permitting efforts will request project authorization under Nationwide Permit (NWP) No. 39. However, NWP 39 only allows for the exemption of 300 linear feet of stream impacts. Thus, it is possible that an Individual Permit (IP) may be required for the proposed project. Following receipt of comments from the USACE, a permitting strategy will be devised to obtain required authorization.

As of this writing, a formal wetland report has not been completed pending designation of pipeline alignments. Because the power plant and associated infrastructure will need to be permitted as a single project, no report and mitigation requirements can be completed until finalization of project design.

No wetlands were identified during the March windshield survey of the utilities corridor. However, this survey was a visual survey only, conducted from public access roads, and does not represent a thorough on-the-ground survey of the entire corridor. According to the Bridgeport West, Boonsville, Gibtown, and

Wizard Wells NWI (FWS, 1992) maps, 21 palustrine emergent marsh (PEM) wetlands have been identified within the corridor. A wetland determination will be completed for the proposed project area once the corridor alignments have been finalized. Appropriate measures will be taken to minimize impacts to wetlands.

A survey for other waters of the U.S. that may reside within the proposed corridor area was also conducted during the March windshield survey. Based on the March windshield survey, aerial photography, and the USGS 7.5-minute Bridgeport West, Boonsville, Gibtown, and Wizard Wells, Texas topographic quadrangle maps, several intermittent and perennial streams, the West Fork of the Trinity River, and Lake Bridgeport are located within the proposed corridor. Impacts, if any, to the above waters of the U.S. will be evaluated once the final corridor alignments have been determined.

5.4.4 Endangered and Threatened Species

5.4.4.1 Vegetation

Information was received from the TPWD's Texas Biological and Conservation Data System concerning the occurrence and location of state and federally listed plant species in the project area (TXBCD, 2002). The official state list of endangered and threatened plant species promulgated by the TPWD includes the same species listed by the FWS as endangered or threatened. Currently, 28 plant species are listed by the FWS as endangered or threatened in Texas (FWS, 1999a, b, and c). However, there are no known locations of threatened or endangered plant species occurring in Jack or Wise counties, and consequently within the project area (FWS, 1999a, b, and c).

The Comanche peak prairie clover, as described in Section 4.4.4.2, is listed by the FWS as a SOC. The Comanche peak prairie clover has been recorded from Wise County, and therefore, may occur within the project area. If the Comanche peak prairie clover is located within either the power plant site or the utilities corridor, appropriate measures will be taken to minimize impacts to this species.

5.4.4.2 Wildlife

According to the TXBCD, no recorded occurrences of endangered or threatened species are located within 1 mile of the power plant site or the utilities corridor. The potential for occurrence of individual species listed by FWS and TPWD as endangered or threatened within the project area are discussed below.

No adverse impacts to any of the avian species addressed in Section 4.4.4.2 are expected as a result of the construction of the power plant. During the January ground reconnaissance survey none of the avian species, or their habitat, addressed in Section 4.4.4.2, were observed within the power plant site. Most are unlikely to occur within the power plant site and those that do are considered only transients, passing through.

During the ground reconnaissance survey no observations were made of the Texas horned lizard, timber/canebrake rattlesnake, or the Texas garter snake, or their habitat, within the power plant site. However, if these species occur at the site, they may be impacted to some extent during the initial clearing and construction phases of the project.

Mammals addressed in Section 4.4.4.2 that have a potential to occur within the power plant site include the Texas kangaroo rat, plains spotted skunk, and black-tailed prairie dog. During the ground reconnaissance survey, no observations were made of these species within the power plant site. Adverse impacts to the Texas kangaroo rat, plains spotted skunk, and black-tailed prairie dog are possible if these species occur and are in underground dens during the time of clearing and construction. The red wolf and the gray wolf are considered extirpated from Texas.

No aquatic species occur within the power plant site; therefore it is unlikely that adverse impacts to aquatic species will occur as a result of the construction of the proposed power plant.

No endangered or threatened species were observed during the windshield survey of the utilities corridor. From this evaluation of the corridor, the presence or absence of endangered and/or threatened species or potential habitat of these species could not be determined. Based on the results of the TXBCD, no recorded occurrences of endangered or threatened species are located within 1 mile of the utilities corridor. An endangered and threatened species survey will be completed once the final corridor alignments have been determined. Appropriate measures will be taken to minimize impacts to endangered or threatened species if they occur within the final corridor alignment.

5.5 SOCIOECONOMIC IMPACTS

For this project, minimal short-term local employment will be generated. BEPC normally uses its own employees or contractors during the clearing and construction phase of projects. A portion of the project wages will find their way into the local economy through purchases such as fuel, food, lodging, and possibly building materials. ROW easement payments will be made to individuals whose lands are crossed by the utility lines based on the appraised land value, and this will result in increased income to those landowners. Since BEPC would only require easements for the utilities corridor, none of this land will be taken off the tax rolls. Furthermore, as a private utility, BEPC is required to pay sales tax on its purchases and local property tax on land or improvements. The cost of permitting, designing, and constructing the plant and utilities will be paid for through a loan guarantee from the USDA RUS and ultimately from revenue generated by the sale of electrical service.

Potential long-term economic benefits to the community resulting from construction of this project area based on the ability of electric utilities to provide an adequate and reliable level of power throughout their service areas. Economic growth and development rely heavily on adequate public utilities, including a reliable electrical power supply. Without this basic infrastructure a community's potential for economic growth is constrained and its ability to meet the demands of future growth would be limited.

Furthermore, disproportionate impacts in relation to environmental justice issues are not indicated, as the area is not characterized by ethnic minority or economically stressed populations (USBOC, 2000).

5.6 LAND USE/AESTHETICS

5.6.1 Land Use

Land use impacts can be determined by the amount of land actually converted from one use to another, and by the compatibility of the proposed use with adjacent land uses. The construction of the proposed Jack County Power Plant Site will directly convert approximately 50 ac of rangeland. With regard to adjacent land uses, the proposed site is surrounded on all four sides by rangeland. The proposed action will not impact or cause the relocation of any existing structure or population, nor should it significantly impact or modify social or community cohesion in the project area. Within the utilities corridor, temporary impacts to land uses within the ROW could occur during construction due to the movement of workers and materials through the area. Construction noise and dust, as well as temporary disruption of traffic flow, may also temporarily affect residents and businesses in the area immediately adjacent to the ROW. Coordination between BEPC, contractors, and landowners regarding access to the ROW and construction scheduling should minimize these disruptions.

An abandoned gas/oil well currently exists on the plant site and is owned by Ray Ritchie Oil Productions in Fort Worth, Texas. A meeting was held with the owner of the well, and during the meeting, construction plans of the power plant were disclosed. The well does not impact the construction, or operations, of Phase I of the power plant. The well owner indicated that there are plans to plug the existing well, and indicated if there are plans to re-drill at the lease, that they would work around the proposed equipment location of both Phase I and Phase II.

The Bridgeport Municipal Airport, with a runway approximately 4,000 ft in length, is located within the utilities corridor. According to Federal Aviation Regulations, Part 77, notification of the construction of a proposed transmission line will be required if structure heights exceed the height of an imaginary surface extending outward and upward at a slope of 100 to 1 for a horizontal distance of 20,000 ft from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 ft.

Potential impacts to recreational land use include the disruption or preemption of recreational activities. Recreational areas located within the utilities corridor, include Lake Bridgeport and the Bay Landing Campsite. Attempts will be made to route the utilities away from these areas.

There will likely be several future electric transmission lines that originate from the power plant site. Their exact locations and alignments have not been determined at this time. It is likely that an alternative routing study/environmental assessment report will be prepared for these lines in support of an application for a Certificate of Convenience and Necessity from the Public Utility Commission of Texas. These lines

will also undergo environmental review by RUS. To the extent reasonable and feasible, these electric transmission lines will utilize or follow existing rights-of-way and property lines to reduce potential land use and environmental impacts.

5.6.2 Aesthetics

As described in Section 4.6.2, the visual environment of the project area is not particularly unique or sensitive within the overall region. The level of human impact is high, both from urban and agricultural development, and there are no designated scenic views, scenic areas, or other protected views in the project area.

There will likely be several future electric transmission lines that originate from the power plant site. Their exact locations and alignments have not been determined at this time. It is likely that an alternative routing study/environmental assessment report will be prepared for these lines in support of an application for a Certificate of Convenience and Necessity from the Public Utility Commission of Texas. These lines will also undergo environmental review by RUS. To the extent reasonable and feasible, these electric transmission lines will utilize or follow existing rights-of-way and property lines to reduce potential land use and environmental impacts.

5.7 NOISE IMPACTS

5.7.1 Construction Impacts

The use of such equipment as backhoes, bulldozers, scrapers, and dump trucks during clearing and excavation related to site preparation will constitute the noisiest period of construction. Typical sound levels at 50 ft from each type of construction equipment are 77, 82, 88, and 78 dBA, respectively (EPA, 1977). The L_{eq} during this period of construction is estimated to be 88 dBA at 50 ft from the center of activity at each site.

When considering the effects of construction activities on local ambient sound levels of the area, "worst-case" conditions are assumed to occur when activities are performed along the perimeter of the proposed project site boundary. Moreover, increased noise levels at other perimeter locations, as well as within the project site boundaries, will be somewhat attenuated by existing vegetation and increased distance. It is anticipated that, under "worst-case" conditions, increased noise levels associated with construction activities will be short-term and will have minor adverse effects on local residences.

5.7.2 Operation Impacts

Noise-producing operations of the proposed project can be categorized into four separate operation types: gas turbine generators (GTG), steam turbine generators (STG), and the cooling tower, and major pumps/motors. These activities can occur simultaneously, although spread out over the project site.

Sound levels for each type of operational equipment type follows: GTG (96 dBA), STG (90 dBA), cooling tower (90 dBA), and major pumps/motors (95 dBA) (MacKenzie, 1998). Numerous studies by Duke/Flour Daniel have provided an approximation of noise level emissions at various distances from the center of a typical 2x1 water-cooled combined cycle power plant. These distances and approximate associated decibel levels are listed in Table 5-1 on the following page. These estimated distances, however, do not take into account factors such as intervening topography, vegetation, and wind direction.

Studies undertaken to review the case histories of community response to intruding noise indicate the following (EPA, 1974):

Sound Level Increase	Expected Community Response
0 to 5 dB	No observed reaction
5 to 10 dB	Sporadic complaints
10 to 15 dB	Widespread complaints
15 to 25 dB	Threats of community action
More than 25 dB	Vigorous community action

As shown in Figure 5-1, the nearest noise-sensitive receiver (Site 2) is located approximately 1,700 ft from the center of the proposed site. At this distance, the operational noise emitted from the facility would be approximately 45 to 55 dBA. Receiver sites 1, 3, 4, 5, 6, and 7 are located between 2,900 ft and 4,900 ft from the center of the proposed project site. At this distance, the operational noise emitted from the center of the proposed site would be less than 45 dBA. According to the EPA, typical residential rural areas have an average L_{dn} of less than 50 dBA (EPA, 1978). Therefore, Receiver Site 2 could have an increase of approximately 5 dBA over its existing level. This sound level increase represents a minor adverse noise impact at this receptor. The proposed power plant's operational noise level will be less than 45 dBA at Receiver sites 1, 3, 4, 5, 6, and 7, and thus, no impact is expected at these sites.

During the Public Meetings there was only one residence out of 121 who attended that had concerns about the noise and the lighting from the plant. Mr. LaFountain lives approximately one mile from the plant site. A response letter was sent to Mr. LaFountain on February 18, 2003 indicating what the estimated lighting and noise levels of the plant would be at his residence. The letter stated information from the Conceptual Design Engineer explaining that based on the distance of one mile, which is the distance from the plant to Mr. LaFountain residence, that a decibel estimate of less than 40 decibels would be present. This is equivalent to common background noise such as wind, birds, etc. The plant is being designed to have sound abatement enclosures around the combustion turbines to reduce the over all noise. The combustion turbines are being designed for 85 decibels at 3 feet.

The following is the typical noise levels for a 2x1 combined cycle power plant (water-cooled) on flat land, or slightly rolling hills ,with equipment specified at source noise 90 dBA at 3 feet.

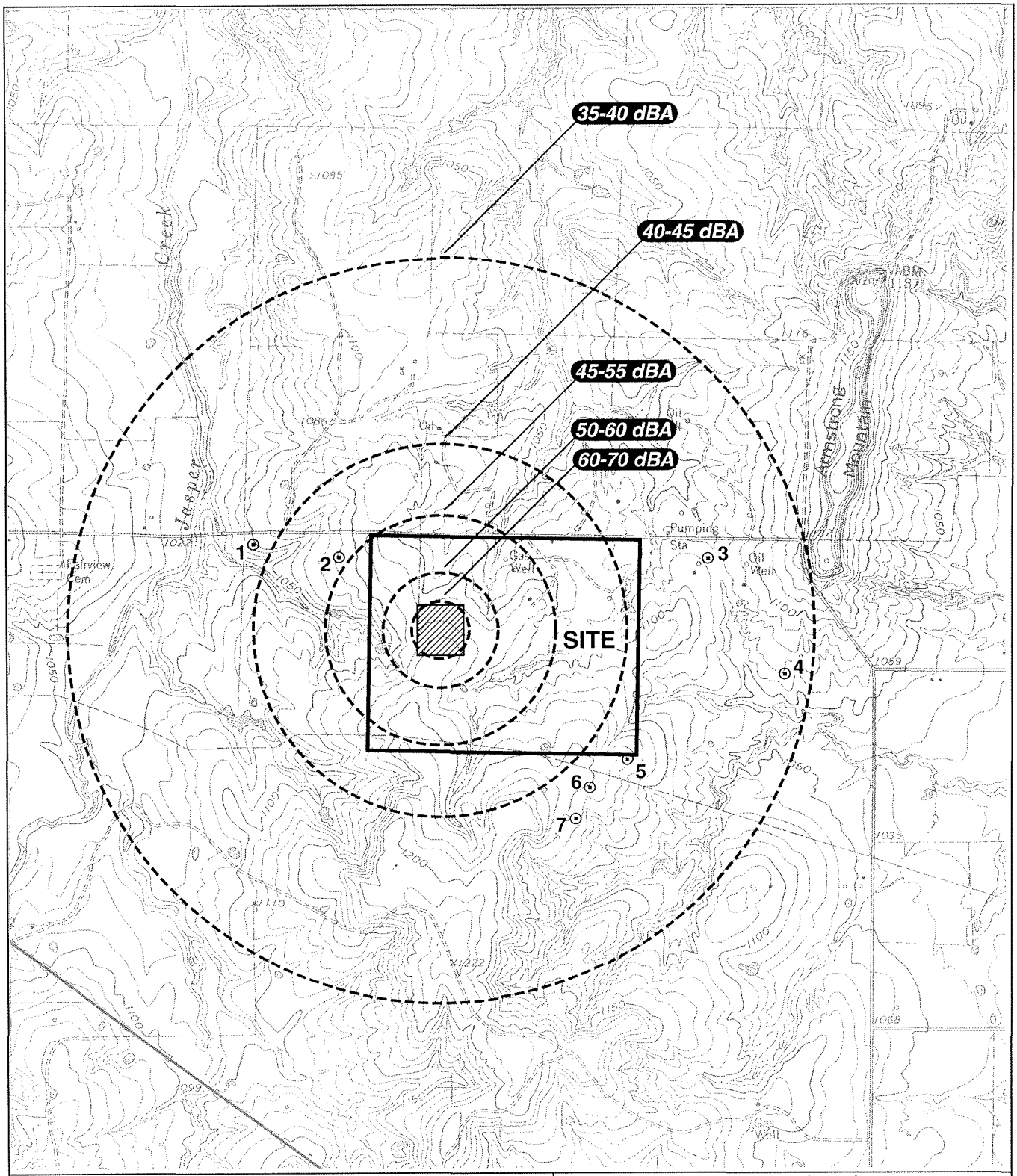
TABLE 5-2

PROPAGATED NOISE LEVEL CONTOURS
FROM CENTER OF TYPICAL 2x1 COMBINED CYCLE POWER PLANT

Distance from Center of Power Plant	Approximate Decibel Level
400 to 500 feet	60 to 70 dBA
800 to 1,000 feet	50 to 60 dBA
1,600 feet	45 to 55 dBA
2,600 feet (~1/2 miles)	40 to 45 dBA
5,200 feet (~1 mile)	35 to 40 dBA

Note: Typical noise levels for a typical 2x1 water cooled Combined Cycle Power Plant, on flat land or slightly rolling hills with equipment at source noise 90 dBA at 3 feet.

Source: Duke/Fluor Daniel.



Base Map: USGS 7.5' Quadrangle; Gibtown

PBS&J

- Engineering
- Environmental Consulting
- Surveying

Figure 5-1

PROJECTED NOISE EMISSIONS AT NOISE SENSITIVE RECEIVER LOCATIONS

JACK COUNTY POWER PLANT PROJECT

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Distance from Center of Plant	Approximate Decibel Level
400 to 500 (near plant fenceline)	60-70 dBA
800 to 1000 feet	50-60 dBA
1600 feet	45-55 dBA
2600 feet (~ ½ mile)	40-45 dBA
5280 feet (~ 1 mile)	35-40 dBA

Typical Rural existing background nighttime noise = 30 to 40 dBA

Note: Background noise is defined as existing sound levels due to wind, weather, train, pass-bys, airplane pass-overs, highway traffic pass-by, animals (birds, crickets, cattle, etc.), existing commercial facilities – all measured by sound receptors and then time averaged.

Mr. LaFountain has not addressed any additional comments or concerns since the public meeting.

The delivery of materials is the responsibility of the EPC contractors. The approximate distance from Farm-to-Market Road 2210 to the site is 1.5 miles. The road will have to be widened in several areas to accommodate heavy haul traffic. Traffic from FM 2210, which is paved, to the site on Henderson Ranch road, which is dirt, passes two residences homes. Water trucks will be used to keep dust down at the plant site and on the county road. Once the plant construction is completed the road will be reconditioned. Discussions with the County have been started to address this issue.

5.8 IMPACTS TO PUBLIC HEALTH

Potential public health impacts could be associated with both the construction and operational phases of the proposed project, from air emissions, water runoff, and noise. During the construction phase, however, these effects would be temporary, transient, and mitigated to a degree by standard construction practices such as dust suppression, erosion/sedimentation controls, etc. and would not present any significant, long-term impacts to public health.

The primary component of the proposed plant's wastewater discharge would be cooling tower blowdown. The two primary water-quality parameters of concern associated with this discharge are TDS and temperature. Each of these parameters will comply with all necessary wastewater/stormwater permit requirements. Thus, it is expected that the proposed discharge will not produce any significant adverse impacts that could affect public health.

Although there are no local, state, or federal regulations regarding acceptable noise levels from this type of facility, PBS&J's noise level predictions indicates that noise from the proposed station will be within both EPA and HUD noise guidelines and criteria and therefore there will be no significant, adverse effects on public health.

There will likely be several future electric transmission lines that originate from the power plant site. Their exact locations and alignments have not been determined at this time. It is likely that an alternative routing study/environmental assessment report will be prepared for these lines in support of an application for a Certificate of Convenience and Necessity from the Public Utility Commission of Texas. These lines will also undergo environmental review by RUS. To the extent reasonable and feasible, these electric transmission lines will utilize or follow existing rights-of-way and property lines to reduce potential land use and environmental impacts.

More detailed discussions of potential impacts related to air emissions, water quality, and noise is presented in sections 5.1, 5.3, and 5.7, respectively.

5.9 CULTURAL RESOURCES

5.9.1 Impacts on Cultural Resources

Any construction activity has the potential for adversely impacting cultural resource sites. The impacts may occur through changes in the quality of the historical, architectural, archaeological, or cultural characteristics of that cultural entity. These impacts may occur when an undertaking alters the integrity of location, design, setting, materials, construction, or association of the property that contributes to its significance according to the National Register criteria. Impacts may be direct or indirect.

As discussed in 36 CFR 800, adverse impacts on National Register or eligible properties may occur under conditions that include, but are not limited to:

1) destruction or alteration of all or part of a property;

2) isolation from or alteration of the property's surrounding environment (setting); or

3) introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting.

Site 41JA17 was recorded by PBS&J archaeologists during the archaeological survey of the proposed 205-acre Jack County Power Plant site. The pedestrian survey at the power plant site was augmented by shovel testing along transects. Based on topography, the survey area was initially defined as having a moderate probability of containing unrecorded cultural resource sites. During the field survey it was observed that the project area had been adversely impacted and did not meet the criteria for moderate probability area. The impacts were primarily a result of sheet erosion. Because of this, modifications were made to the survey methodology utilized during the fieldwork.

The shovel test transects were spaced at 50 meter (m) intervals in a north-south orientation. Along each of the transects, shovel tests were attempted every 100 m. However, due to modern disturbance, exposed bedrock, or more than 90% ground visibility, the interval between shovel tests was sometimes greater

than 100 m. The shovel tests that were excavated were taken down to the Bt horizon. In some cases, bedrock was encountered before the Bt horizon was reached and the shovel tests were terminated at that point. A total of 128 shovel tests were excavated in the project area, four of which yielded artifacts.

5.9.1.1 Direct Impacts

Direct impacts to known or unknown cultural resources sites may occur during the construction phase of the proposed project. Direct impacts may be caused by the actual construction of the proposed plant and associated utilities, or through increased vehicular and pedestrian traffic during the construction phase. The increase in vehicular traffic may damage surficial or shallowly buried sites, while the increase in pedestrian traffic may result in vandalism of some sites. Additionally, the integrity of the character of any unrecorded, significant historic structures could also be visually impacted by the construction of the proposed plant or other associated facilities.

5.9.1.2 Indirect Impacts

Indirect impacts include those caused by the undertaking that occur later in time or are further removed in distance but are reasonably foreseeable. These indirect impacts may include alteration in the pattern of land use, changes in population density, accelerated growth rates, or increased pedestrian or vehicular traffic, all of which may have an adverse impact on properties of historical, architectural, archaeological or cultural significance. Historical sites and landscapes might be adversely impacted by the visibility of the proposed plant or the transmission towers and lines.

5.9.1.3 Mitigation

The preferred form of mitigation for cultural resources is avoidance. An alternative form of mitigation of direct impacts can be developed for archaeological and historical sites with the implementation of a program of detailed data retrieval. Additionally, relocation may be possible for some historic structures. Indirect impacts on historical properties and landscapes can be lessened through careful design considerations and landscaping.

5.9.1.4 Summary of Cultural Resources Impacts

One of the methods utilized to assess an area for potential cultural resources is to identify a high probability area (HPA). When identifying HPAs, the topographic setting, environment, and the availability of raw material and water and subsistence resources are all taken into consideration. Generally, when defining a HPA, a distance relationship to a water resource is set which would encompass landforms within approximately 1,000 ft of any perennial and/or intermittent drainage. HPAs would be located in an environmental setting that would provide either adequate food or lithic resources. Geological processes are also important because they have the potential for protecting the integrity of an archaeological site by burying it within deep sediments or destroying it by erosional processes.

One archaeological site (41JA17) is located within the boundaries of the 205-ac plant site. The THC has not had the opportunity to evaluate 41JA17 and consultation with them will be required to determine the NRHP eligibility status of the site. None of the NRHP-listed or determined eligible for listing properties, or SAL-designated sites identified during the records review are located within the plant site boundaries or within the corridors. Additionally, none of the OTHMs, Texas Historic Cemeteries, Century Farms or Ranches, or NRHP listed bridges are located in the plant site or within the utilities corridor.

Portions of the utilities corridor area are considered to have a high probability for containing unrecorded cultural resource sites. The lack of previously recorded archaeological sites in the utilities corridor area should not be viewed as a low probability that sites occur there. Rather the low number of previously recorded sites is a reflection of the limited amount of previous archaeological investigations in the area. Historic house structures and possibly stock tanks and cattle pens may be located near reliable water sources or along older county roads, however, some of the other historical features, such as windmills, may be located anywhere on the landscape.

There is a high probability that cultural resources are present within the utilities corridor area. However, adverse impacts to cultural resources sites can be mitigated through proper Cultural Resources Management planning.

6.0 CUMULATIVE IMPACTS

The project area occurs within a largely rural and agricultural landscape. No new residential subdivisions or commercial developments are known to be planned for the immediate project area. However, it is possible that new construction of single-family dwellings may occur at various times on various private landholdings near the project area. Construction of an additional, new electrical generation station and associated infrastructure was recently completed near the Jack-Wise county line approximately 4 miles southeast of the proposed BEPC facility. The combined development of the proposed BEPC facility and the recently completed facility may have a minor cumulative effect on the natural and human environment within the project area. Potential impacts may include increased air emissions, increased water demand, land conversion, and possible loss of native vegetation and wildlife habitat. Specific, future related impacts and/or projects in the vicinity of the proposed BEPC generation station are unknown by PBS&J at this time.

While BEPC will irreversibly expend labor, materials, fuel (natural gas), etc., in the construction and operation of the proposed power station, no other known irreversible or irretrievable commitments of natural resources will occur. As the purpose of the proposed generation station is to meet rising energy demand in the project area, it will not create any significant new energy demand. In addition, no new, unusual, or limited sources or types of materials are proposed for use in this project.

Brazos Electric purchased the development rights, and site option to acquire the Jack County site, from Duke Energy North America (DENA). The air permit had already been issued to DENA for the site to support a nominal 520-MW combined cycle unit at 9 ppm NO_x. ENSR conducted the air dispersion model and prepared the final report for the Texas Commission for Environment Quality (TCEQ), previous known as TNRCC. DENA was in the process of revising the permit to support a 620-MW duct-fired plant at the time of Brazos Electric acquired the development rights from DENA. The permit NO_x limits was changed to 5 ppm NO_x when the permit was revised.

To evaluate the probability of adding a Phase II 2x1 combined cycle unit to the site, Brazos requested DENA to have ENSR conduct an air dispersion model to determine the feasibility of having a second combined cycle unit on the site. ENSR found no significant impacts by adding a second combined cycle unit using an air cooled condenser in place of a water cooling tower. The only design change impact was to the auxiliary boiler stack height on Phase II Auxiliary Boiler. A formal air dispersion model report will be conducted when a decision is made to proceed with phase II

The TCEQ has the responsibility for developing a plan for attaining the National Ambient Air Quality Standards (NAAQS) in Texas and more specifically, within the Dallas-Fort Worth (DFW) Nonattainment Area. This plan, which was submitted to and approved by the EPA, is called the State Implementation Plan (SIP). The SIP describes how an area will maintain attainment with the NAAQS or if in nonattainment, how it will achieve attainment of the air quality standards. For a nonattainment area such

as DFW, the SIP sets emissions budgets for point sources such as power plants and manufacturers, area wide sources such as dry cleaners and paint shops, off-road mobile sources such as boats and lawn mowers, and on-road sources such as cars, trucks, and motorcycles.

Limitations on the levels of certain pollutants are set by the NAAQS and the SIP. The SIP for the DFW area includes enforceable commitments required by the EPA for reducing emissions of NO_x and VOC such that the area will attain the NAAQS for ozone. The SIP is a dynamic plan which can be constantly updated to account for changing conditions. New regulations and control strategies resulting from the DFW SIP impose emission control measures affecting various sources of air emissions including stationary sources, on-road mobile sources, non-road mobile sources, and area sources.

The TCEQ also has regulations in place to control emissions of air contaminants through the implementation of emission standards and by an elaborate permitting system which requires the implementation of best available emissions control technology for the construction of new industrial facilities or modifications. These regulations are designed to provide for growth in a way that will continue attainment of the standards.

Air emissions from the proposed Brazos' and Tractebel's Power Plants will be addressed by this regulatory framework. The TCEQ and EPA are responsible for monitoring and tracking air quality levels and the identification of potential air quality exceedances. Within the DFW Area, adjustments will be made to the SIP, as appropriate, to achieve and maintain continued attainment of the standards. In addition, area industrial, community, and municipal groups are working cooperatively with the regulatory agencies to identify ways to continue to reduce emissions while allowing for growth in the area.

6.1 MITIGATION

Potential impacts from the power plant construction and utility construction would be similar, although pipeline construction activities would be more temporary in nature. Conversely, the construction of the power plant would result in permanent impacts within the footprint of permanent plant facilities. The following is a summary of measures that BEPC will undertake to mitigate the effects of the construction and operation of the Jack County Power Plant and associated infrastructure.

- Efforts will be made during construction for proper control and handling of any petroleum or other chemical products used.
- Appropriate erosion-control measures will be utilized during construction activities in accordance with the project SWPPP and standards regulated by the EPA.
- Because final utility alignments have not been determined, final protocol for ROW maintenance has not been developed. However, BEPC will follow all applicable standards and guidelines for ROW maintenance (including use of EPA-approved herbicides if/where required).

- Construction activities will be performed in such a manner as to minimize adverse impacts to adjacent habitats.
- Ongoing coordination with the THC will determine whether mitigation for the power plant site will be required and what mitigative measures will suffice. Further, once final utility alignments have been identified, the THC will determine acceptable sampling protocol and subsequent mitigation (if any) based on ROW survey findings.
- Ongoing coordination with the USACE will determine whether mitigation will be required for power plant and associated utility construction. Because final utility alignments have not been determined, a final ruling on permitting and mitigation requirements (if any) have not been dictated. Because the USACE will not permit the power plant separately from other project activities, an assessment of mitigation requirements cannot be made until utility surveys have been completed.
- The clean-up operation will involve the removal of debris and the restoration of items damaged by the construction of the project as required. BEPC will assure that affected areas are restored as close to the original condition as practical.

7.0 FEDERAL/STATE AGENCY COORDINATION

Federal law requires that agencies other than the RUS review certain potential environmental impacts of the proposed project and coordinate with the project sponsor and the RUS. The first step in this process involves identifying and contacting relevant local, state, and federal agencies/offices, as well as other non-governmental groups with interests in the area, in order to determine which environmental resources occur in the project area, and therefore might be affected.

The following local, state, and federal agencies and officials were contacted by letter in March 2003 to solicit comments, concerns and information about the proposed project and to seek information about further permitting or consultation. A map showing the proposed project site on a 1:24,000 USGS topographic quadrangle was included with each letter. This section (and the correspondence included in Appendix A) is intended to document the coordination with other federal and state agencies required by the National Environmental Policy Act (NEPA). The following agencies were solicited for comments:

Texas Historical Commission	Federal Emergency Management Agency
Texas Parks and Wildlife	Bureau of Indian Affairs
Texas Department of Transportation, Department of Aviation	Texas Department of Transportation, Environmental Affairs Division
Texas Water Development Board	Texas Commission on Environmental Quality
Federal Aviation Administration	U.S. Army Corps of Engineers
Natural Resources Conservation Service	National Park Service
U.S. Environmental Protection Agency	U.S. Fish and Wildlife Service

As of this writing, several responses had been received from federal and state agencies. A summary of their comments follows. Copies of this correspondence are located in Appendix A of this EA. Any additional comments received will be included as addendums to the final report.

In a response from the Texas Historical Commission (THC), it was indicated that the proposed plant site contains landforms with a high probability for containing archaeological sites. It was recommended that a cultural resource survey of the intact landforms and areas containing historic buildings be conducted. They would review the project once again after alignment of additional infrastructure was identified and will review the methodology and probability maps created by PBS&J following required surveys.

PBS&J performed a pedestrian survey of the proposed power plant site (see Section 4.0) and a report of findings with recommendations has been submitted to the THC for review and concurrence. As of this writing, a response has not been received.

The Natural Resources Conservation Service (NRCS) responded that they rated the project as required by the Farmland Protection Policy Act (FPPA). Their evaluation of the soils of the proposed power plant

site indicated that none of the soils were classified as Important Farmlands (IPs). They indicated that powerlines and pipelines may cross IPs, but such activities are not considered a permanent conversion and would be exempted from the FPPA. If any other structures (e.g., substations) were planned for the project, an additional review would be recommended. The NRCS included a completed AD-1006 for the power plant site indicating the approval status.

The Federal Emergency Management Agency (FEMA) indicated that it was important in their mitigation efforts that proper measures be taken to reduce losses as a result of development in floodplain areas. They recommended contacting the local floodplain administrator to identify any special flood hazard areas and to identify local floodplain requirements and required floodplain permits.

As discussed in Section 4.3.2 of the EA, no Flood Hazard Boundary Maps or Flood Insurance Rate Maps have been produced for Jack County. Further, no floodplain administrator resides in jack County. However, based on review of floodplain data for adjacent Wise County, it is believed that no floodplain concerns exist within the proposed plant site.

In a response from the U.S. Department of the Interior, Bureau of Indian Affairs (BIA), it was stated that the BIA has no jurisdiction in the proposed project area and, thus, had no information regarding sensitive resources that may be impacted by the project. They recommended further consultation with the Wichita and Affiliated Tribes, Comanche Tribe of Oklahoma and the Kiowa Tribe of Oklahoma regarding potential impacts to areas of importance in those Peoples' cultures and histories. Contact information for the tribes listed was included with the BIA correspondence.

The Texas Department of Transportation, Environmental Affairs Division responded that they had no comments on the proposed project at this time.

The U.S. Army Corps of Engineers (USACE) in responses to Mr. Glendon Deal, RUS and a separate solicitation from PBS&J stated that based on their project review, they were unable to determine based on the information provided, if USACE authorization would be required, and if so, in what form. They offered various permitting scenarios including Regional General Permits (RGP), Nationwide Permits (NWP), and Individual Permits (IP). They also included a list of additional supporting documentation they would need in order to complete their evaluation with guidance details for supplemental submittals. They encouraged the avoidance and minimization of adverse impacts to streams, wetlands, and other waters of the United States during the planning phase of this project. During subsequent consultation with the USACE, it was determined that a final permitting scenario could not be determined until final alignment of associated power plant infrastructure (i.e., pipelines and powerlines) was identified.

The U.S. Department of the Interior, National Park Service (NPS) stated that since there were no NPS units in the project vicinity, they had no comments on the project.

The response from the U.S. Department of the Interior, Fish and Wildlife Service (FWS), indicated that two federally listed endangered and one candidate species have been documented, or are known to occur in Jack and Wise Counties, Texas. The species listed were the black-capped vireo (endangered), whooping crane (endangered), and black-tailed prairie dog (candidate). They stated that no critical habitat is designated for these species within the project area and that candidate species are not afforded federal protection under the Endangered Species Act. However, they recommended that potential impacts to these species be considered during project planning efforts. They also indicated that the proposed project was not likely to affect the whooping crane or the black-tailed prairie dog, but that project activities may affect the black-capped vireo. They recommended that the proposed project area be surveyed to determine whether suitable habitat exists for the vireo, and if so, subsequent presence/absence surveys should be conducted. Guidelines of minimum survey procedures should be used for survey activities. They also expressed concern due to potential losses of wetland and wildlife habitat and impacts to riparian corridors because of construction activities and recommended that the EA quantify any such impacts and a mitigation plan be developed that demonstrates how impacts to fish and wildlife resources be avoided, minimized, and/or compensated. They included general guidelines for linear utility construction and requested a copy of the EA for review.

PBS&J ecologists experienced with vireo habitat and survey protocol, performed a site evaluation of the proposed plant site based on FWS recommendations and determined that suitable habitat did not occur. Additional surveys of utility corridors were not performed and supplemental surveys of habitats associated with power plant utilities will be conducted following final alignment determinations. Similarly, wetland issues are being addressed within the proposed power plant site, however, final mitigation requirements (if any) cannot be determined and a mitigation plan (if required) cannot be prepared until final utility alignments have been determined.

8.0 PUBLIC INVOLVEMENT PROGRAM

The RUS, in conjunction with BEPC, posted notice of its intent to construct a gas-fired electrical generation plant in several newspapers in Jack and Wise counties. Public notice was posted in the *Alvord Gazette*, *Jack County Herald*, *Jacksboro Gazette-News*, *Bridgeport Index*, the *Chico Texan*, the *Wise County Messenger*, and the *Fort Worth Star Telegram*. The RUS published a notice of intent in the *Federal Register* on January 31, 2003.

Two public meetings were held to solicit information from the citizens of Jack and Wise counties, Texas regarding the proposed generation plant. A total of nine (9) people signed in at the meeting held on February 11, 2003, while a total of one hundred and eighteen (118) signed in at the public meeting held on February 12, 2003. A questionnaire, project map, and self-addressed postage paid envelope were given to each person in attendance with a request that the questionnaire be completed either that evening or at a later date and mailed to BEPC in order that their comments could be evaluated.

In addition to the two public meetings, BEPC met with civic leaders of both Jack and Wise counties, notifying them of the public meetings and receiving their input on the proposed project. As of February 26, 2003, BEPC has received a total of one hundred and twenty-six (126) questionnaires. BEPC's questionnaire asked citizens to mark their preferred placement of the new generation plant. The three sites under consideration are Boonsville, Bridgeport, and Jack County. Two of the respondents favored the Boonsville site, four respondents favored the Bridgeport site, and one hundred and twenty favored the Jack County site.

Ten respondents asked for a follow-up. Upon contacting one individual, their only comment was that they believed the generation plant needed to be sited in Jack County to help the Jack County economy. Those that favored the Jack County site had similar comments. Three individuals voiced concerns about the proposed generation plant. Those concerns included traffic, noise, lighting, road conditions, air pollution, health issues, and safety. BEPC staff addressed these concerns verbally at the public meeting and followed-up with additional information. A facsimile dated February 14, 2003, and a letter dated February 17, 2003, was sent to those individuals addressing their concerns.

Findings of all completed questionnaires, verbal conversations, and subsequent phone calls, faxes, and e-mails indicate that an overwhelming majority prefers the Jack County site to the other two alternatives (Boonsville and Bridgeport). An additional comment period will be provided to all interested parties through subsequent public notice.

9.0 REFERENCES

American Ornithologists' Union (AOU). 1998. Check-list of North American Birds. Seventh edition. Allen Press, Inc., Lawrence, Kansas. 829 pp.

———. 2000. 42nd supplement to the check-list of North American birds. Auk 117:847–858. Lawrence, Kansas.

———. 2002. 43rd supplement to the check-list of North American birds. Auk 119:897–906.

Bartlett, R.D. and Bartlett, P.P. 1999. A Field Guide to Texas Reptiles and Amphibians. Gulf Publishing Company. Houston, Texas.

Black, A. and G. Kegley. 1998. Fort Richardson State Historical Park, Jack County, Texas, Texas Archeological Testing and Recording 1978, 1979,. 1981, 1985, 1986. Texas Parks and Wildlife Department, Austin.

Blair, W.F. 1950. The biotic provinces of Texas. Texas Journal of Science 2:93–117.

Bomar, G.W. 1983. Texas Weather. University of Texas Press Austin, Texas. 265 pp.

Brazos Electric Power Cooperative, Inc. (BEPC). 2003. Jack Energy Facility. Technical Scope of Work, Turnkey Engineering, Procurement and Construction. Waco, Texas. 95 pp.

Briggs, A.D. 1991. An archeological and historical survey of the proposed Lost Creek Reservoir Boat Ramp, Jacksboro, Jack County, Texas. Lone Star Archaeological Services, THC Permit No. 979, Jack County Vol. I.

Bureau of Economic Geology (BEG), the University of Texas at Austin. 1967. Revised 1991. Geologic Atlas of Texas, Sherman Sheet. Austin, Texas.

Burns & McDonnell Engineering Company, Inc. 2002. Final Report on the Gas-Fired Plant Site Selection Study. Prepared for Brazos Electric Power Cooperative, Inc. Project 32264. Kansas City, Missouri.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. FWS/OBS-79/31. Performed for Office of Biological Services, Fish and Wildlife Service, U.S. Department of the Interior.

Crother, B.I. (ed). 2000 (2001). Scientific and standard English names of amphibians and reptiles of North America north of Mexico, with comments regarding confidence in our understanding. SSAR Herpetological Circular 29.

Crook, W.W. Jr., and R.K Harris. 1957. Hearths and artifacts of early man near Lewisville, Texas and associated faunal material. Bulletin of the Texas Archeological Society 28:7–97.

Davis, W.B. and D.J. Schmidly. 1994. The mammals of Texas. Texas Parks and Wildlife Dept. Distributed by University of Texas Press. 338 pp. Austin.

Del Monte, B.E. 1998. Fur-bearing animal regulations/evaluation of annual fur harvest. Federal Aid Grant No. W-126-R-6, Project No. 11. Texas Parks and Wildlife Department, Austin, Texas. 30 April 1998. 14 pp.

Dessamae, L. 1972. Archeological investigations at Fort Richardson State Historic Site, Jack County, Texas. Research Report No. 10. The University of Texas at Austin.

Diamond, D.D., D.H. Riskind, and S.L. Orzell. 1987. A framework for plant community classification and conservation in Texas. Texas Journal of Science 39(3):203–221.

Dickinson, M.B. (Ed.). 2002. Field guide to the birds of North America. Fourth Edition. National Geographic Society. Washington, D.C.

Dickson, D. and W. Westbury. 1976. Archaeological research at Fort Richardson State Park, Summer 1975. Archeological Report No. 28, Texas A&M University, THC Permit No. 91.

Dixon, J.R. 2000. Amphibians and reptiles of Texas. Texas A&M University Press, College Station, Texas. 421 pp.

Duffield, L.F. and E.B. Jelks. 1961. The Pearson Site: A Historic Indian site in Iron Bridge Reservoir, Rains County, Texas. Archeology Series 4, Department of Anthropology, The University of Texas at Austin.

Federal Aviation Administration (FAA). 2002a. Airport/Facility Directory – South Central U.S. Washington, D.C.

———. 2002b. Dallas-Fort Worth Sectional Aeronautical Chart. Washington, D.C.

Federal Emergency Management Agency (FEMA). 1990. Flood Insurance Rate Map (FIRM) for Wise County, Texas. National Flood Insurance Program. Washington, D.C.

Fish and Wildlife Service (FWS), U.S. Department of the Interior. National Wetlands Inventory (NWI) Maps. 1992. Bridgeport West, Boonsville, Gibtown, and Wizard Wells, Texas. U.S. Department of the Interior.

———. 1995. Threatened and endangered species of Texas. Austin, Texas. June 1995.

———. 1998. Federally listed species of Texas, county by county. FWS, 16 July 1998.

———. 1999a. Federally listed species of Texas, county by county. FWS, 30 June 1999.

———. 1999b. Endangered and threatened wildlife and plants; review of plant and animal taxa that are candidates for listing as endangered or threatened species. Federal Register 64(205): 57534–57547.

———. 1999c. Endangered and threatened wildlife and plants. 50 CFR 17.11 and 17.12. 31 October 1999. Washington, D.C. 57 pp.

———. 2000. U.S. Fish and Wildlife Service Threatened and Endangered Species System (TESS). Available on the Internet: <http://ecos.fws.gov/webpage/webpate_usa_lists.html> 15 August 2000.

Fox, D. 1981. An archeological reconnaissance at City of Jacksboro, Jack County, Report 48-1509. Texas Department of Water Resources, Jack County Vol. I. Austin.

Gould, F.W. 1975. Texas plants - A Checklist and Ecological Summary. MP-585/Rev. Texas A&M University, Texas Agricultural Experiment Station, College Station, Texas. 121 pp.

Greenwade, J. 2003. Natural Resource Conservation Service (NRCS). Personal communication to R. Reid, PBS&J. March 21, 2003.

Griggs, J.L. 1997. American Bird Conservancy's field guide: All the Birds of North America. Harper Perennial, New York.

Guffee, E. 1980. Letter to J-A-C Electric Cooperative, Bluegrove, Texas, Distribution Line Survey. Survey Report Museum of the Llano Estacado, Plainview.

Hatch, S.L., K.N. Gandhi, and L.E. Brown. 1990. Checklist of the vascular plants of Texas. MP-1655. Texas A&M University, Texas Agricultural Experiment Station, College Station, Texas. 158 pp.

Holzworth, G.C. 1972. Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States. AP-101. EPA, Research Triangle Park, N.C.

———. 1974. Meteorological Episodes of Slowest Dilution in Contiguous United States. EPA-650/4-74-002. EPA, Research Triangle Park, N.C.

Hosler, C.R. 1961. Low-Level Inversion Frequency in the Contiguous United State. *Monthly Weather Review*, Vol. 89, pp. 319–339.

Hubbs, C. 1957. Distributional patterns of Texas freshwater fishes. Southwestern Naturalist 2:89–104.

Hubbs, C., R.J. Edwards, and G.P. Garrett. 1991. An annotated checklist of the freshwater fishes of Texas, with keys to identification of species. Texas Journal of Science 43(4):1–56. (Plus errata sheet, February 1996.)

Jelks, E.G. 1967. The Gilbert Site: A Norteno Focus Site in northeastern Texas. Bulletin of the Texas Archeological Society 37:1–248.

Kenmotsu, N.A. and T.K. Perttula. 1993. Archeology in the eastern planning region, Texas: A planning document. Department of Antiquities Protection. Cultural Resources Management Report 3. Texas Historical Commission. Austin.

Korshover, J. 1971. "Climatology of Stagnating Anticyclones East of the Rocky Mountains, 1936–1970," U.S. Department of Commerce NOAA Technical Memorandum ERL ARL-34, October 1971.

Lee, D.S., C.R. Gilbert, C.H. Hocutt, R.D. Jenkins, D.E. McAllister and J.R. Stauffer, Jr. 1980. Atlas of North American Freshwater Fishes. North Carolina State Museum of Natural History. Raleigh, North Carolina.

Manning, R.W. and C. Jones. 1998. Annotated checklist of recent land mammals of Texas, 1998. Occasional Papers Museum Texas Tech University, Number 182. 16 November 1998. 20 pp.

Marshall, J.T., R.B. Clapp, and J.A. Grzybowski. 1985. Status report: Vireo atricapillus Woodhouse, black-capped vireo. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 40 pp. and figs.

Martin, A.C., H.S. Zim, and A.L. Nelson. 1951. American Wildlife and Plants: A Guide to Wildlife Food Habits. Dover Press, New York.

McMahan, C.A., R.G. Frye and K.L. Brown. 1984. The vegetation types of Texas, including cropland. Texas Parks and Wildlife Department, Austin, Texas. 40 pp.

Morizot, D.C. and T. Maechtle. 1987. Migratory peregrine falcons on North and South Padre Island, Texas. Report to U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 12 pp.

National Weather Service (NWS). 2003. Dallas/Ft. Worth Climate Overview. http://www.shr.noaa.gov/FWD/CLIMO/dfw/annual/dnarritive.html. March 13, 2003.

Natural Resource Conservation Service (NRCS). 1992. Land Use Estimates By County For Texas. Natural Resources Inventory Division. Available on the internet: <http://www.nhq.Nrcs.usda.gov/NRI_getdata.html> June 22, 1998.

Oberholser, H.C. 1974. The Bird Life of Texas. 2 vol. University of Texas Press, Austin, Texas. 1,069 pp.

Ortego, B. 2001. Texas Parks and Wildlife Department, personal communication to D. Munson, PBS&J. Austin, Texas. 29 May 2001.

Perez, R. 1999. Quail harvest regulations. Performance Report, Federal Aid Project No. W-126-R-7, Project No. 5. Texas Parks and Wildlife Department. Austin, Texas. 19 April 1999.

Peterson, M.J. 1998a. Small game planning, administration, and coordination. Performance Report, Federal Aid Grant No. W-126-R-6, Project No. 12. Texas Parks and Wildlife Department. Austin, Texas. 9 April 1998. 5 pp.

———. 1998b. Turkey harvest regulations. Performance Report, Federal Aid Grant No. W-126-R-6, Project No. 6. Texas Parks and Wildlife Department. Austin, Texas. 27 May 1998. 8 pp.

Pulich, W.M. 1988. The Birds of North Central Texas. Texas A&M University Press, College Station, Texas. 440 pp.

Roberson, J. 1999. Mourning dove density, distribution, and harvest. Performance Report, Federal Aid Project No. W-128-R-7, Job No. 1. Texas Parks and Wildlife Department, Austin. 31 August 1999.

Roberson, W. and J. Ing. 1974. Fort Richardson State Historic Park: Archeological tests at the Bakery Building, September, 1973. Report No. 16 Texas Parks and Wildlife Department, Austin.

Schmidly, D.J. 1983. Texas Mammals East of the Balcones Fault Zone. Texas A&M University Press, College Station, Texas. 400 pp.

Scott, R. and V. Cole. 1986. Archeological Survey of Lost Creek Reservoir, Jack County, Texas.

Shalkowski, Joseph S. 2001. "A Practical Approach to Addressing Environmental Justice during the NEPA Process: Completing and Documenting the EJ Evaluation." Environmental Analysis in Transportation, Volume XVIII, No. 1.

Soil Conservation Service (SCS) [now the Natural Resources Conservation Service (NRCS)], U.S. Department of Agriculture. 1973. General Soil Map, Jack County, Texas (with 1999 revisions by NRCS, Jacksboro, Texas.) In cooperation with the Texas Agricultural Experiment Station. Washington, D.C.

———. 1989. Soil Survey of Wise County, Texas. In cooperation with Texas Agricultural Experiment Station. Washington D.C.

State Department of Highways and Public Transportation. 1987. Cultural resources Assessment: FM 2190: From US 281 to West End of Existing FM 2190.

Sullivan, B.D. 1999. Waterfowl populations and distribution. Performance Report, Federal Aid Grant No. W-128-R-7, Project No. 3. Texas Parks and Wildlife Department. Austin, Texas. 27 October 1999. 17 pp.

Tennant, A. 1998. A Field Guide to Texas Snakes. Second Edition. Gulf Coast Publishing, Houston, Texas. 291 pp.

Texas Biological and Conservation Data System (TXBCD). 2002. Special species and natural community data files and TXBCD data on USGS topographic maps. November.

Texas Commission on Environmental Quality (TCEQ). 1994. The State of Texas Water Quality Inventory. Surface water quality monitoring program. TNRCC, Vol. 2., Austin, Texas.

———. 2003. Dallas/Ft. Worth Climate Overview. Available on the internet: <http://222.tnrcc.state.tx.us/cgi-bin/monops/site)info> March 13, 2003.

Texas Department of Transportation (TxDOT), Aviation Division. 1998. Scenic Overlooks and Rest Areas. Texas Highways, Vol. 45, No. 8. August 1998.

———. 2001. Texas Airport Directory. Austin, Texas.

Texas Department of Transportation (TxDOT). 1995a. Archaeological resources survey report: Park Road No 61: Extension of Fort Richardson State Park.

———. 1995b. Archaeological resources survey report: CR 112 at Kerr Branch Crossing.

———. 1996. Archaeological resources survey report on Hillcrest Drive from the south end of Hillcrest Drive to Lindy Street, Volume II, Young County.

Texas Department of Water Resources (TDWR). 1982. Occurrence, Availability, and Chemical Quality of Ground Water in the Cretaceous Aquifers of North-Central Texas. Vol.2, Austin, Texas.

———. 1983. Climatic Atlas of Texas. Texas Department of Water Resources Austin, Texas. 151 pp.

State Department of Highways and Public Transportation (SDHPT) (now known as the Texas Department of Transportation [TxDOT]).

———. 1936b. General Highway Map, Jack County, Texas.

———. 1936c. General Highway Map, Wise County, Texas.

———. 1948. General Highway Map, Jack County, Texas.

———. 1949. General Highway Map, Wise County, Texas.

———. 2002b. "JACK COUNTY." The Handbook of Texas Online. Available on the internet: <http://www.tsha.utexas.edu/handbook/online/articles/view/JJ/hcj1.html> Accessed November 11, 2002.

———. 2002c. "WISE COUNTY." The Handbook of Texas Online. Available on the internet: <http://www.tsha.utexas.edu/handbook/online/articles/view/WW/hcw14.html> Accessed November 11, 2002.

Texas Organization for Endangered Species (TOES). 1995. Endangered, threatened, and watch list of Texas vertebrates. TOES Publication 10. Austin, Texas. 22 pp.

Texas Ornithological Society (TOS). 1995. Checklist of the birds of Texas, 3rd Edition. Capital Printing, Inc., Austin, Texas. 166 pp.

Texas Parks and Wildlife Department (TPWD). 1984. 1985 Texas Outdoor Recreation Plan (TORP). Comprehensive Planning Branch, Parks Division. PWD Plan 4000-367. Austin, Texas.

———. 1990. Texas Outdoor Recreation Inventory (TORI) Database. Austin, Texas.

———. 1999. Texas threatened and endangered species. PWD-LF-W3000-017. Austin, Texas. March 1999.

———. 2001. Big game harvest survey results 1990–2001. 10 May 2001. Texas Parks and Wildlife Dept.

Texas Water Development Board (TWDB). 1984. Water For Texas. A comprehensive plan for the future. Technical Appendix. Vol. 2. Austin, Texas.

———. 1988. Occurrence and Quality of Ground Water in Jack County, Texas. Report 308. Austin, Texas.

———. 1995. Aquifers of Texas. Ashworth, John B. and Janie Hopkins. Report 345. Austin, Texas.

———. 1997. Water for Texas. A consensus-based update to the state water plan. Technical Planning Appendix. Vol. 2. Austin, Texas.

———. 2001. 2002 State Water Plan. Population Projections By County. Available on the internet:<http://www.twdb.state.tx.us/data/popwaterdemand/countypopulation.htm>

Texas Workforce Commission (TWC). 2002. Covered Employment and Wages. Available on the internet: <http://www.twc.state.tx.us/lmi/lfs/type/coveredemployment/coveredemploymenthome.htm>

———. 2003. Civilian Labor Force Estimates. Available on the internet: <http://www.twc.state.tx.us/lmi/lfs/type/unemployment.htm>

U.S. Bureau of Census (USBOC). 1983. 1980 Census of Population. General Social and Economic Characteristics, Texas. U.S. Department of Commerce, Washington, D.C.

———. 1990. American FactFinder. Social Characteristics:1990. Available on the internet: <http://factfinder.census.gov>

———. 2000. American FactFinder. Quick Tables 2000. Available on the internet: <http://factfinder.census.gov>

U.S. Department of Agriculture (USDA). 1992. The Prime Farmlands of Texas. Soil Conservation District [now the Natural Resources Conservation Service (NRCS)].

U.S. Geological Survey (USGS), Department of the Interior. 1960a. 7.5 Minute Topographic Map. Boonsville, Texas Quadrangle.

———. 1960b. 7.5 Minute Topographic Map. Bridgeport West Quadrangle. Photo revised in 1978.

———. 1960c. 7.5 Minute Topographic Map. Gibbtown Quadrangle. Photo revised in 1976.

———. 1960d. 7.5 Minute Topographic Map. Wizard Wells Quadrangle. Photo revised in 1978.

Westbury, W. 1976. Archeological Investigations at Fort Richardson State Park. Archeological Report No. 31 Texas A&M University, THC Permit No. 113. College Station.

10.0 LIST OF PREPARERS/REVIEWS

This Environmental Assessment was prepared for BEPC by PBS&J. BEPC provided information in sections 2.0, 3.0, and other sections where public meetings/public involvement were addressed. A list of RUS, BPEC, and PBS&J employees with primary responsibilities for the preparation of this document is presented below:

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Transmission	Sam Gourley	Electrical Engineer
Project Review	Larry Wolfe	Sr. Environmental Protection Specialist
BEPC		
Project Review	Mike McClendon	Regulatory Coordinator
Project Review	Dave McDaniel	Manager, Project Services
Project Review	Billy Helpert	Manager, Power Supply
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Project Review	Dwight Beckman, P.E.	Planning Engineer
Project Review	Wade Snider	Planning Economist
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	Chris Miller	Project Manager
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	Mark Van Dyne	Program Manager
Maps/Figures/Graphics	David Kimmerling	Senior Graphics Technician

Appendix A

Agency Correspondence

TEXAS HISTORICAL COMMISSION

The State Agency for Historic Preservation

GEORGE W. BUSH, GOVERNOR

JOHN L. NAU, III, CHAIRMAN

F. LAWERENCE OAKS, EXECUTIVE DIRECTOR

April 10, 2003

L. Christopher Miller, CWB, CF
Project Manger-Ecology Program
PBS&J
206 Wild Basin Road, Suite 300
Austin, Texas 78746

Re: Project review under Section 106 of the National Historic Preservation Act of 1966, Brazos Electric Power Cooperative's proposed 50-acre power plant, intake structure at Lake Bridgeport, and 10 mile natural gas pipeline near Joplin, Jack County, Texas (RUS)

Dear Mr. Miller:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Debra L. Beene, has completed its review. The study area contains landforms with a high probability for containing archeological sites. We will recommend a cultural resource survey of the intact landforms and areas containing historic buildings. We will be pleased to review the project again once the exact placement of the line has been established or review the methodology and probability maps created by PBS&J's archeological staff.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your assistance in this state review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Debra L. Beene at 512/463-5865.**

Sincerely,

for
F. Lawerence Oaks, State Historic Preservation Officer

FLO/dlb

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Southern Plains Regional Office
P.O. Box 368
Anadarko, Oklahoma 73005

IN REPLY REFER TO:

Natural Resources

MAR 24 2003

L. Christopher Miller, CWB, CF
Project Manager - Ecology Program
PBS&J
206 Wild Basin Road, Suite 300
Austin, Texas 78746-3343

Dear Mr. Miller:

Thank you for the opportunity to review the Brazos Electric Power Cooperative (BEPC) proposed power plant and water pipeline project in Jack County, Texas. This office has no jurisdiction in the proposed project area and therefore, have no information regarding sensitive natural resources that might be impacted by the project. It is recommended that you consult with the Wichita and Affiliated Tribes, Comanche Tribe of Oklahoma and Kiowa Tribe of Oklahoma regarding potential impacts to areas of importance in those Peoples' cultures and histories. Addresses and contacts for those Tribes are enclosed

Sincerely,

Thomas E. Gorry

Regional Archeologist

Enclosure

SOUTHERN PLAINS REGION TRIBES
NAGPRA COORDINATORS/HISTORIC PRESERVATION OFFICERS
(AUGUST, 2002)

ANADARKO AGENCY

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AMERICAN INDIAN ART CENT.
206 S. BUCKEYE
ABILENE, KANSAS 67410

BOBBIE DARNELL, CHAIRPERSON
KICKAPOO TRIBE IN KANSAS
P.O. BOX 271
HORTON, KANSAS 66439
(785)486-2131
(785)486-2801

CURTIS SIMON

ZACHARIAH PAHMAHMAI, CHAIRMAN
PRAIRIE BAND OF POTAWATOMI TRIBE
16277 Q ROAD
MAYETTA, KANSAS 66509
(785)966-2255
(785)966-4002 (FAX)

REY KITCHKUMME

Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

March 31, 2003

Mr. L. Christopher Miller
Project Manager, Ecology Program
PBS&J
206 Wild Basin Road, Suite 300
Austin, Texas 78746

RE: Brazos Electric Power Cooperative Proposed Power Plant
Project No. 441159.00

Dear Mr. Miller:

The Texas Department of Transportation (TxDOT), Environmental Affairs Division, is in receipt of your letter regarding the above referenced project submitted to our office on March 10, 2003. At this time, TxDOT has no comments on this project. Thank you for the opportunity to participate in this review.

Sincerely,

Ann M. Irwin
Deputy Division Director
Environmental Affairs Division

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF

March 26, 2003

Planning, Environmental, and Regulatory Division
Regulatory Branch

SUBJECT: Project Number 200300162

Mr. L. Christopher Miller, CWB, CF
Project Manager - Ecology Program
PBS&J
206 Wild Basin Road, Suite 300
Austin, Texas 78746

Dear Mr. Miller:

Thank you for your letter of March 10, 2003, concerning a proposal by Brazos Electric Power Cooperative, Inc. to construct a new power plant near Joplin in Jack County, Texas. This project has been assigned Project Number 200300162. Please include this number in all future correspondence concerning this project. Failure to reference the project number may result in a delay.

We have reviewed this project in accordance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Under Section 404, the U. S. Army Corps of Engineers regulates the discharge of dredged and fill material into waters of the United States, including wetlands. Our responsibility under Section 10 is to regulate any work in, or affecting, navigable waters of the United States. Any such discharge or work requires Department of the Army authorization in the form of a permit. For more information on the USACE Regulatory Program, please see our Internet homepage at www.swf.usace.army.mil/regulatory/.

We are unable to determine from the information that you provided in your letter whether Department of the Army authorization will be required and, if so, in what form. Please provide us with a more detailed description of the proposed project, a suitable map of the proposed project area showing the location of proposed discharges, the type and amount of material (temporary or permanent), if any, to be discharged, and plan and cross-section views of the proposed project. Please refer to the enclosed guidance for Department of the Army submittals for additional details about what you should submit for this and future projects.

We encourage you to avoid and minimize adverse impacts to streams, wetlands, and other waters of the United States in planning this project. Please forward your response to us as soon

as possible so that we may continue our evaluation of your request. Please note that it is unlawful to start work without a Department of the Army permit when one is required.

Thank you for your interest in our nation's water resources. If you have any questions concerning our regulatory program, please contact Mr. Ken Laterza at the address above or telephone (817)886-1735.

Sincerely,

for Wayne A. Lea
Chief, Regulatory Branch

Enclosure

US Army Corps
of Engineers
Fort Worth District

General Recommendations for Department of the Army Permit Submittals

June 11, 2001

The following recommendations from the U.S. Army Corps of Engineers (USACE), Fort Worth District, specify information that should be submitted with project proposals for review of permitting requirements under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899:

1. The purpose of, and need for, the project.

2. A delineation and description of wetlands and other waters of the United States in the area that would be affected by the proposed work, and a description of the project's likely impact on the aquatic environment. Delineations of wetlands must be conducted using the "Corps of Engineers Wetland Delineation Manual", USACE Waterways Experiment Station Wetlands Research Program Technical Report Y-87-1, dated January 1987 (on-line edition available at http://www.wes.army.mil/el/wetlands/wlpubs.html), including all supplemental guidance (currently includes guidance dated October 7, 1991, and March 6, 1992). The supplemental guidance is included in the on-line version and may also be obtained from your USACE district office. In addition, include the width and depth of the water body and the waterward distance of any structures from the existing shoreline.

3. A vicinity map (e.g., county map, USGS topographic map, etc.) showing the location of all temporary and permanent elements of the project, including the route of the entire highway or road, borrow pit(s), disposal site(s), staging area(s), etc. This map, or an additional map, should show the project area in relation to nearby highways and other roads, and other pertinent features. A ground survey is not required to obtain this information. (All maps and drawings must be submitted on 8½ by 11 inch sheets.)

4. Plan, profile, and cross-section views of all work (fills, excavations, structures, etc.), both permanent and temporary, in, or adjacent to, waters of the United States, including wetlands, and a description of the proposed activities and structures, such as the dimensions and/or locations of highways and roads (both temporary and permanent), coffer dams, equipment ramps, borrow pits, disposal areas, staging areas, haul roads, and other project related areas within the USACE permit area(s). The permit area(s) includes all waters of the United States affected by activities associated with the project, as well as any additional area of non-waters of the United States in the immediate vicinity of, directly associated with, and/or affected by, activities in waters of the United States. The USACE permit area(s) includes borrow pits, disposal areas, staging areas, etc. in many cases. A description of the proposed work should include such information as the height, width, and length of structures and fills, widths of cleared rights-of-way, location of all affected areas of waters of the United States, and the size and spacing of culverts, bridges and other crossings of waters of the United States. (All maps and drawings must be submitted on 8½ by 11 inch sheets.)

5. The volume of material proposed to be discharged into and/or excavated from waters of the United States and the proposed type and source of the material.

6. A written discussion of the alternatives considered and the rationale for selecting the proposed alternative as the least environmentally damaging practicable alternative. Practicable alternatives that do not involve a discharge into a special aquatic site, such as wetlands, are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise. The package should also include documentation that the amount of area impacted is the minimum necessary to accomplish the project.

7. An assessment of the adverse and beneficial effects, both permanent and temporary, of the proposed work and documentation that the work would result in no more than a minimal adverse impact on the aquatic environment.

8. A compensatory mitigation plan for unavoidable adverse impacts to the aquatic environment. This plan should include a description of proposed appropriate and practicable actions that would restore, enhance, protect, and/or replace the functions and values of the aquatic ecosystem unavoidably lost in the project area because of the proposed work.

9. A discussion documenting whether any species listed as endangered or threatened under the Endangered Species Act might be affected by, or found in the vicinity of, the USACE permit area for the proposed project. Direct coordination with the FWS concerning the potential impact of the entire project on endangered and threatened species is strongly encouraged.

10. A discussion documenting whether any cultural resources, particularly those historic properties listed, or eligible for listing, in the National Register of Historic Places (NRHP), would be affected by, or are in the vicinity of, the USACE permit area for the proposed project.

11. Documentation that any permanent above-grade fills in waters of the United States within the 100-year floodplain comply with FEMA, or FEMA-approved local, floodplain development requirements.

12. The applicant should include any other relevant information, including information on hydrology and hydraulics.

United States Department of the Interior
NATIONAL PARK SERVICE
INTERMOUNTAIN REGION
12795 West Alameda Parkway
PO Box 25287
Denver, Colorado 80225-0287

IN REPLY REFER TO:

MAR 2 7 2003

L. Christopher Miller
PBS&J
206 Wild Basin Road, Suite 300
Austin, TX 78746

Subject: Proposed Project – Jack County, Texas
PBS&J Project No. 441159.00

Dear Mr. Miller:

The National Park Service has reviewed the subject project and has determined there are no National Park Service Units in the vicinity. In view of this, the National Park Service has no comments on this project.

We appreciate the opportunity to comment. If you have any questions, please contact me at (303)969-2036.

Sincerely,

Laurie Domler
NEPA/Section 106 Specialist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
WinSystems Center Building
711 Stadium Drive, Suite 252
Arlington, Texas 76011

2-12-03-I-221

April 3, 2003

Mr. L. Christopher Miller, CWB, CF
PBS&J
206 Wild Basin Road, Suite 300
Austin, Texas 78746

Dear Mr. Miller:

This responds to your March 10, 2003, letter requesting comments on Brazos Electric Power Cooperative's proposed construction of a new power plant in Jack and Wise Counties, Texas. The proposed project also includes the construction of a water intake structure at Lake Bridgeport and installation of approximately 10-miles of natural gas and water pipelines. The comments provided by our office are to be used in the preparation of an Environmental Assessment (EA).

Threatened and Endangered Species

Our records indicate the following federally listed threatened (T), endangered (E), and candidate (C) species have been documented, or are known to occur in Jack and Wise Counties, Texas.

black-capped vireo	*Vireo atricapillus*	E
whooping crane	*Gus americana*	E
black-tailed prairie dog	*Cynomys ludovicianus*	C

No critical habitat is designated for listed species in Jack and Wise Counties. Candidate species are not afforded federal protection under the Endangered Species Act; however, we recommend that potential impacts to these species be considered during project planning. Based on the information provided in your letter and review of our files, we believe the proposed project is not likely to adversely affect the whooping crane and the black-tailed prairie dog. However, the proposed project may affect the black-capped vireo.

The black-capped vireo can be found in central and north-central Texas from mid-March through mid-September. Limestone soils and rocky outcroppings are common in areas occupied by the black-capped vireo. The habitat of the black-capped vireo is highly variable with respect to species composition. Deciduous trees, evergreen trees, and shrubs are commonly found in vireo habitat. Also, in Texas, suitable vireo habitat is characterized by an identifiable "patchy" structural appearance.

Based on a cursory review of aerial photographs of the project study area, we believe that some proposed project areas may possess characteristics indicative of suitable black-capped vireo habitat. Therefore, proposed project areas should be checked for the presence of suitable vireo habitat. If suitable habitat exists within or near the proposed project area, the areas should be surveyed for the presence/absence of the black-capped vireo. Surveys should be performed by a federally permitted ornithological consultant familiar with the life history and habitat requirements of the black-capped vireo. Surveys should use guidelines for minimum survey procedures available from this office. If results of the survey indicate "absence" of black-capped vireos, no further coordination with this office would be necessary. Construction activities which would not directly impact vireo habitat but are within 100 yards of suitable habitat should be scheduled outside of the birds' breeding season; however, if this is not possible or practical, surveys and/or further coordination with this office may be necessary.

Wetlands and Wildlife Habitat

Due to the large size of the general study area for the site alternatives, a review of the National Inventory maps for the specific types and locations of wetlands within this study area was not practical. However, it is noted that several creeks and streams, and numerous forested, emergent and open-water wetland areas, as well as the riparian zones associated with these areas, occur within the general study area.

Impacts to wetlands and the clearing of vegetation from riparian areas associated with the construction of pipeline right-of-way can result in significant impacts to fish and wildlife habitat. These impacts can include direct habitat loss, habitat fragmentation, soil erosion, and alteration of the hydrology of the impacted area. Numerous species of resident and migratory wildlife depend on wetlands and riparian corridors for food, water, nesting habitat, and often as dispersal and/or travel corridors. Riparian corridors often furnish some of the best wildlife habitat in an area and may provide the only suitable habitat for certain wildlife species.

For these reasons, we are concerned about the potential permanent loss of wildlife habitat due to clearing of new right-of-way for the proposed water and gas lines. These losses may be significant depending on the final site selection. Therefore, we recommend the EA for the proposed project describe and quantify all impacts to fish and wildlife resources, especially to wetland, riparian, and upland forested areas for each alternative site. The preferred alternative should be based on the site that is anticipated to have the least amount of overall impacts. A mitigation plan should be developed early in the project planning process, and subsequently reviewed by the resource agencies. The mitigation plan should demonstrate how impacts to fish and wildlife resources would be avoided, minimized, and/or compensated. Additionally, we have enclosed some general guidelines for linear utility construction that may help to minimize project related impacts. As soon as it becomes available, please submit a copy of the EA for our review.

Thank you for the opportunity to provide comments during the planning phase of this project. If you have any questions, please contact Omar Bocanegra or Cindy Gabrielsen of my staff at (817) 277-1100.

Sincerely,

Thomas J. Cloud, Jr.
Field Supervisor

Enclosure

General Recommendations for Avoiding and/or Minimizing Environmental Impacts from Utility Pipeline Construction

The U.S. Fish and Wildlife Service places a high priority on the conservation of wetlands and riparian corridors due to the inherent value and significant level of benefits these areas provide to a multitude of fish and wildlife species. In addition to the food, shelter, and habitat they provide to fish and wildlife, these areas also furnish invaluable ecological services to the watershed and the community. They act as a buffer zone for pollutants and sediment entering the stream via storm water runoff. They also prevent erosion, and provide a pervious surface to facilitate the percolation of storm water to prevent flooding.

The best method of avoiding and/or minimizing environmental impacts caused by linear utility construction is to utilize existing right-of-way (transmission line, highway, pipeline, etc.) for the new route. This often eliminates or greatly reduces the need to clear wildlife habitat for construction. The following additional recommendations for avoiding and/or minimizing construction related impacts commonly associated with utility pipeline projects should also be considered, especially when using existing right-of-way is not possible. These are only general recommendations; details for avoiding and minimizing all potential impacts should take into account specific project and site descriptions at each sensitive area. The development of specific mitigating measures for anticipated environmental impacts should focus on protecting the integrity of stream banks, riparian zones, and wetlands.

- **Route alignment should be adjusted where necessary to avoid wetland impacts and to avoid losses of moderate-aged to mature-aged trees.** Utilizing existing right-of-ways reduces environmental impacts usually associated with utility pipeline construction. However, where proposed routes would require new right-of-way, minor adjustments in route alignment could minimize impacts to fish and wildlife habitat. Route modification should include avoiding wetlands and crossing creeks and streams where the riparian corridor is at its minimum width.

- **Directional drilling should be used at all wetlands, perennial streams, and other waterbodies.** The process of boring under waterbodies greatly reduces impacts to wetlands, streams, or other sensitive areas that usually occur with the open-cut or trenching method of utility pipeline installation. When construction must occur during the rainy season, directional drilling also reduces sedimentation and erosion resulting from construction activity. Because this method often avoids or reduces impacts to wetlands and waters of the U.S., potential project mitigation required under section 404 of the Clean Water Act would also be minimized.

- **Temporary workspaces at stream crossings should be placed outside of the riparian zone of the respective stream.** Temporary workspaces are often needed where pipeline routes cross creeks, streams, roads, railways, or other linear obstacles and construction requires an alternate method such as directional drilling. Should temporary workspaces be necessary for directional drilling or other method of installation, they should not be located within the riparian zone of creeks, streams, or other waterbodies. They should also not be located within wetlands.

- **Temporary right-of-ways within or adjacent to riparian areas should be hand cleared.** Clearing of permanent right-of-way and the construction and installation of pipeline requires the use of heavy machinery. In riparian and other wooded areas, the use of heavy machinery and other equipment is often detrimental to the underground root system of adjacent trees not intended for removal. Oaks are particularly sensitive to ground disturbance caused by heavy equipment and often die when their roots are damaged. Temporary areas cleared by machinery may also reduce subsequent revegetation by native hardwoods due to the damaged root mat from which new saplings originate. Therefore, we recommend temporary workspaces and right-of-ways within or adjacent to riparian corridors be cleared with chainsaws to avoid additional tree loss and encourage new hardwood growth following construction.

- **Trenching of creeks, streams, and other wetland areas should be conducted during a dry period.** Trenching or open-cut methods of pipeline installation may be necessary if directional drilling of waterbodies is not possible or practical. To reduce the potential for soil erosion, creek sedimentation, and impacts to aquatic species, trenches and open-cut methods should be conducted during the dry season, preferably mid to late summer.

- **All temporary right-of-ways and workspaces should be revegetated immediately following construction with native vegetation appropriate to habitat type.** It is important that disturbed areas be revegetated following construction activities to prevent erosion, reduce sedimentation, and decrease the chance of non-native, invasive plant species from becoming established. We would be glad to provide information on appropriate native grasses, shrubs, and trees for replanting in the project area.

- **Right-of-way width should be reduced to the minimum amount necessary to allow pipe installation at riparian areas.** New right-of-way for pipeline projects usually includes a temporary right-of-way for allowing access for equipment and workspace for construction. The environmental consequences of using temporary right-of-ways may be minimal, especially when they are located adjacent to roads or occur in pastures and agricultural areas. However, at stream crossings, temporary right-of-ways may remove valuable wildlife habitat. For these areas, additional workspace should be placed outside of the riparian corridor and every effort be made to avoid clearing more vegetation than is necessary to install the pipeline.

- **Unavoidable wetland impacts should be mitigated through in-kind creation or restoration of wetland areas that establish similar functions and values of the affected wetlands.** Federal policy provides that wetland losses be mitigated to restore lost habitat values of equal or greater value to fish and wildlife resources. This includes restoring or creating areas that retain the primary hydrological characteristics of the affected wetlands and revegetating the disturbed land with native plant species appropriate to habitat type.

We also recommend all areas that would be avoided using these or other measures (e.g., mature trees, riparian areas) be marked with orange guard fence or flagged prior to construction to prevent accidental clearing by work crews. All mitigation measure developed for a specific project should be incorporated into the Environmental Assessment for the

proposed project as well the project plans to ensure implementation by the contractor. Additionally, if impacts to wetlands, creeks, streams, or other water bodies are anticipated, you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is required by that Agency prior to commencement of construction .

Appendix B

Public Involvement Information

BRAZOS ELECTIC POWER COOPERATIVE, INC.
PROPOSED GENERATION PLANT PROJECT

PUBLIC MEETING DATES: FEBRUARY 11th and 12th 2003

Thank you for taking time to become involved in the siting of the proposed Brazos Electric Gas-fired Generation Facilities. The generation project is planned to help meet existing electrical load within the project area and throughout the Brazos System covering approximately 65 counties in Texas. Brazos Electric will select one of the three sites depicted on the associated maps for the proposed generation facility. Once a site has been selected, Brazos Electric in conjunction with the USDA Rural Utility Service will post notice within local newspapers and provide the public with an additional comment period.

Please visit the different stations and gather information about the project. Some of the stations available are:

Station No. 1: Purpose & Need - This station contains a Brazos Electric System Map, which shows the electric transmission lines, and substations, which Brazos serves and is staffed by persons that can answer your questions regarding the purpose and need for the facilities.

Station No. 2: Environmental - Persons that can answer your questions regarding environmental and permitting requirements for the proposed facilities staff this station.

Station No. 3: Design/Construction - This station contains photographs and drawings of the proposed generation facility and is staffed by persons that can answer your questions about design and construction of the generation facility.

Station No. 4: Land Issues - Persons that can answer your questions regarding rights-of-way for future gas, water, and transmission lines staff this station.

Drop-Off/Questionnaire Refreshments - To ensure your comments are taken into consideration, please fill out your questionnaire at one of the available tables and drop it in the collection box. If you want to take the questionnaire home, please mail it to us within a few days. Self-addressed stamped envelopes have been provided for your convenience.

If you have additional comments or questions, contact Dennis Rankin with the Rural Utilities Service at 202-720-1953 or Mike McClendon with Brazos Electric at 254-750-6326 or Mickey Green with Brazos Electric at 254-750-6395 or Brazos Electric toll free at 1-888-751-6500 or write to: Brazos Electric, P.O. Box 2585, Waco, Texas 76702-2585, Attention: Mike McClendon.

Thank you for your time and participation!

BRAZOS ELECTRIC COOPERATIVE

QUESTIONNAIRE

GAS-FIRED GENERATION PLANT PROJECT

In an effort to better evaluate community concerns, we would appreciate it if you would take a moment to answer the following questions:

1. Do you understand the need for the project?
   Yes _____ No ___

2. Several factors are considered when siting a generation facility, including
   - Residences, businesses, schools, churches, hospitals, nursing homes
   - Cemeteries, parks, and/or recreational areas, aesthetics
   - Airports, runways
   - Historical and archeological sites
   - Environmentally sensitive areas, endangered species
   - Agricultural & urban areas
   - Gas lines and transmission lines
   - Water sources

   Do you believe that all relevant factors are being considered? Are you aware of any features not depicted correctly or not shown on the map? (The aerial photography was taken around 1996; therefore some data will not be depicted on the aerial photographs. Updated imagery is being obtained at this time.)

3. Please list any additional concerns that you believe need to be addressed.

4. Please indicate your preferred site for the gas-fired generation facility. The three potential generation sites have been identified below and correspond to the associated maps.

   - ___ Boonsville
   - ___ Bridgeport
   - ___ Jack County

5. Approximately how far is your property in relation to the nearest proposed generation site?

   Which proposed generation site are you closer to?

   Do you live on this property?

6. Would you like a follow-up contact to discuss the project in more detail?

7. Please provide the following information:

Name_____

Street_____ Phone Number
Home:_____

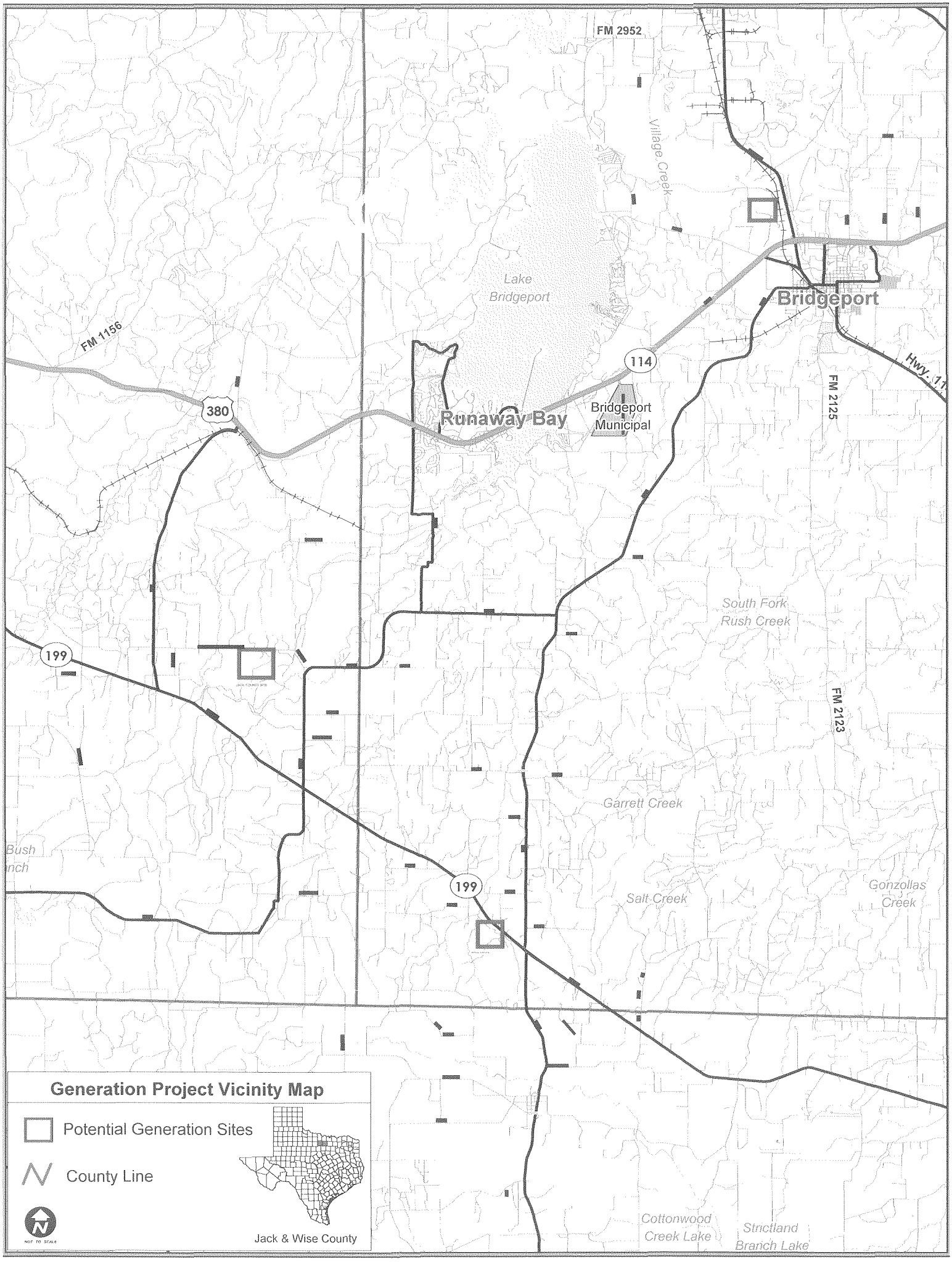
City_____ Office:_____

E-mail_____

THANK YOU FOR YOUR COMMENTS

Please mail to:
Mike McClendon
Brazos Electric Power Cooperative, Inc.
P.O. Box 2585
Waco, Texas 76702-2585
Phone: 888/751-6500 (toll free)
Mike McClendon 254/750-6326 (direct)
Mickey Green 254/750-6395 (direct)

PLEASE DROP THIS IN THE BOX OR RETURN WITHIN A FEW DAYS.


FM 2952
Village Creek
Lake Bridgeport
Bridgeport
FM 1156
114
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Runaway Bay
Bridgeport Municipal
Hwy. 11
FM 2125
South Fork Rush Creek
199
FM 2123
Garrett Creek
Bush
nch
199
Salt Creek
Gonzollas Creek
Cottonwood Creek Lake
Strictland Branch Lake
Generation Project Vicinity Map
Potential Generation Sites
County Line
NOT TO SCALE
Jack & Wise County